OC ACTIVE

ORANGE COUNTY'S BIKE + PED PLAN

OCTA

DECEMBER 2019

Prepared for: Orange County Transportation Authority

Prepared by: IBI Group with KTUA, PlaceWorks, and Arellano Associates

IBI

This page intentionally left blank.

CONTENTS

This page intentionally left blank.

EXECUTIVE SUMMARY

OC Active: Orange County's Bike + Ped Plan is the first countywide Active Transportation Plan (ATP) for Orange County that addresses both bicycle and pedestrian networks. The Orange County Transportation Authority (OCTA) has developed this plan to provide a framework for bikeway and pedestrian planning across the county, and to be compliant with the Caltrans Active Transportation Program (ATP) guidelines. This will allow local cities and the County of Orange to use this document as a foundation to apply for state funding to plan and implement local bicycle and pedestrian projects.

Plan Goals

Seven distinct goals were identified to guide decision making during the preparation of OC Active. The goals help to ensure OC Active supports regional mobility needs and empowers local jurisdictions to provide a responsive transportation network. During the development process, these goals were discussed with the OC Active Stakeholder Working Group (SWG), the Orange County Council of Governments (OCCOG) Technical Advisory Committee, OCTA's Technical Advisory Committee, and the Citizens Advisory Committee Bike and Pedestrian Subcommittee.

1 REDUCE PEDESTRIAN & BICYCLIST COLLISIONS

OCTA and local agencies in Orange County are very interested in reducing the number of fatal and serious injury collisions involving bicyclists and pedestrians. Continued investment in the active transportation network will also close gaps in the system and address challenges for improved safety.

2 ADVANCE STRATEGIC WALKING & BIKING NETWORK

Bicycle and pedestrian facilities that provide safe and convenient access to major destinations, schools, and parks are essential to maintaining Orange County's high quality of life. Facilities that connect multiple cities are also important to increase mobility and encourage use of active transportation modes.

3 ENHANCE WALKING & BIKING ACCESS TO TRANSIT

As the regional transit operator in Orange County, OCTA is interested in improving access to transit for residents throughout Orange County, helping to improve mobility and increase transit ridership.

4 IMPROVE HIGH-NEED PEDESTRIAN AREAS

The plan identifies areas throughout Orange County where the need for improved pedestrian infrastructure is high compared to the county as a whole. Mapping the pedestrian realm high need areas will help guide investment for improved mobility, safety, and equity.

5 STRENGTHEN STAKEHOLDER PARTNERSHIPS

OC Active builds on a history of OCTA, the County, local cities, and community stakeholder groups cooperating together to plan and implement regional bicycle and pedestrian infrastructure. This plan identifies strategies and opportunities to continue and strengthen these partnerships going forward.

6 INCORPORATE DIVERSE COMMUNITY PERSPECTIVES

The community outreach effort focused on connecting with residents throughout Orange County. The plan strategies and recommendations are strengthened by the diverse and widespread input received during the project engagement with the community.

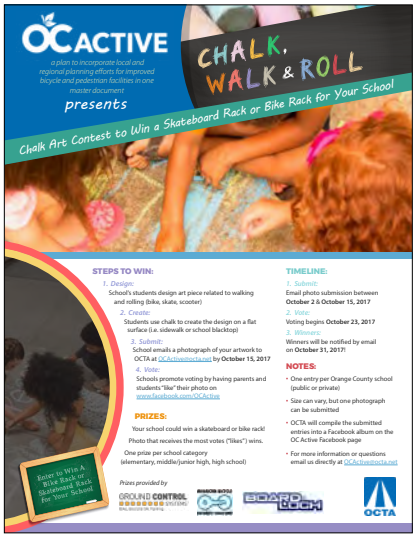
7 LEVERAGE FUNDING OPPORTUNITIES

OCTA is focused on helping local cities to pursue and obtain grant funding to support the planning, design, and construction of the active transportation improvements identified in OC Active. This plan will serve as the foundation for local agencies to pursue funding opportunities for project implementation.

Public Outreach

The public outreach effort conducted in support of OC Active was focused on engaging and involving residents located throughout Orange County. The effort sought to maximize participation from disadvantaged communities within the county, while also creating fun and educational events and contests that encouraged participation from youth. Several key outreach efforts included:

- Speaking and hosting booths at seventy-six (76) community events in 2017 and 2018
- An online and in-person survey focused on issues and opportunities related to walking was conducted in conjunction with the community events
- A Chalk, Walk, And Roll contest in Fall 2017 where local schools were invited to create art work using chalk that illustrated safe walking and bicycling activity
- A Connect With A Cop event in March 2018 where OCTA partnered with a local police department for a fun and educational event
- Participation in International Walk to School Day in October 2018 to promote project awareness and obtain input for a second survey, focused on bicycling improvements



Pedestrian Network

Orange County's existing pedestrian network is comprised of sidewalks, multi-use trails, pedestrian bridges, and other walking infrastructure designed to help people access key destinations including schools, employment centers, parks, and transit. The county is home to a diverse network of pedestrian conditions. Consequently, the amount of pedestrian activity and need varies substantially throughout the county.

The OC Active pedestrian network analysis mapped the highest need pedestrian focus areas countywide and provides a detailed map for each jurisdiction countywide. The focus areas were identified using a Geographic Information Systems (GIS) analysis. This incorporated multiple criteria including key destinations, community demographics, socioeconomic and health data, as well as potential barriers to pedestrian travel such as roadways with high traffic volumes, railroads, waterways, and freeways. Public input from the project survey was incorporated into the technical analysis, as well as OCTA-prepared mapping of sidewalk gaps along major roadways countywide.

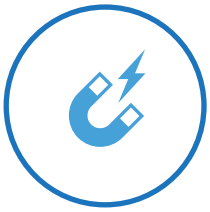
GIS modeling was prepared focusing on three key categories; attractors, generators, and barriers. Combining these three layers of GIS analysis for each category provides a heat map indicating the highest need areas.

Generators

These are demographic, socioeconomic and health data indicating potential pedestrian volume based on how many people live and work within each city. Examples of generators are population and employment density and primary mode of transportation to work. Socioeconomic and health data examples include median household income, CalEnviroscreen (a land use planning tool), free or reduced meal programs, vehicle ownership and age density.

Barriers

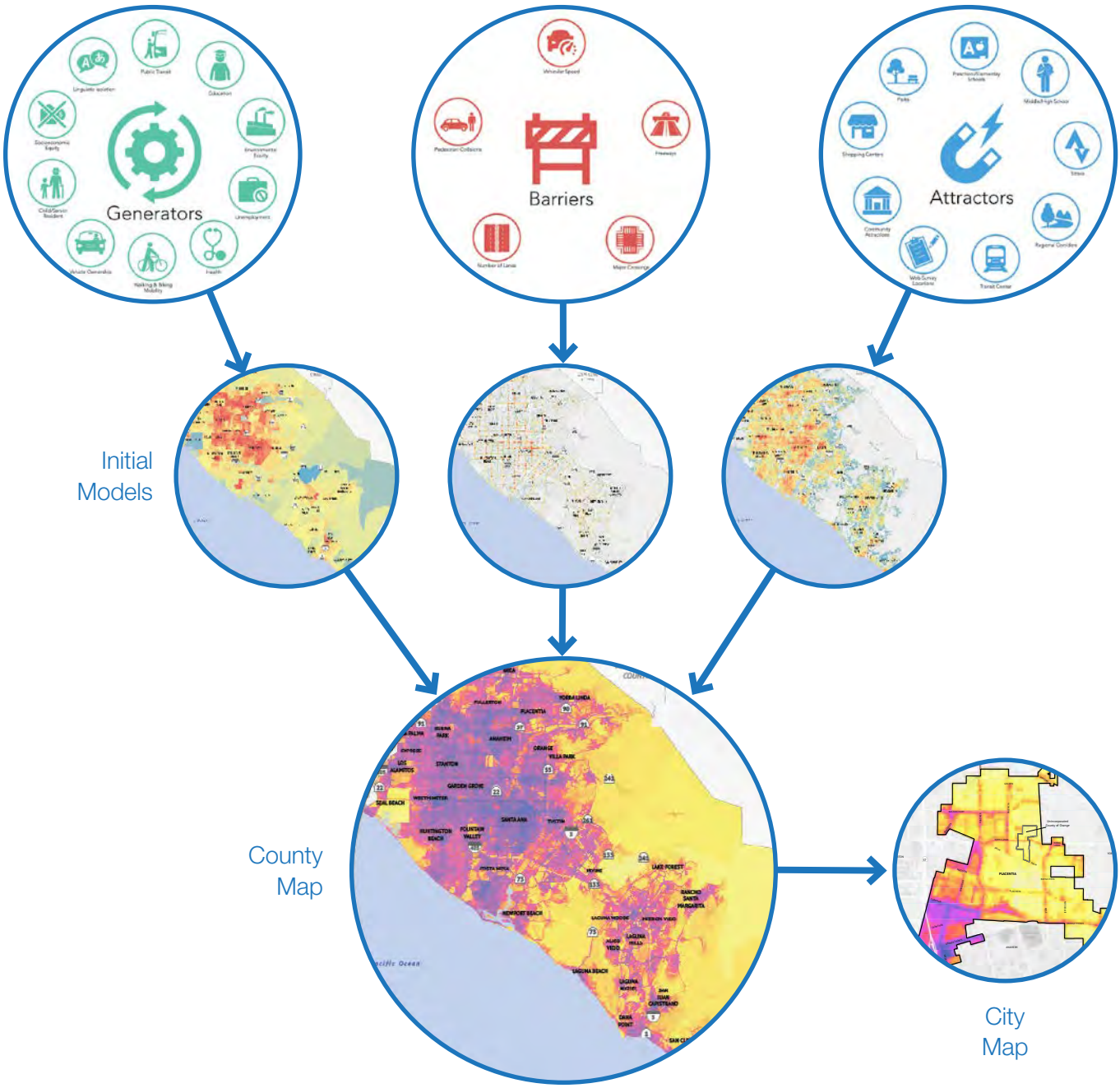
These are features likely to discourage or detract people from walking. These are generally physical limitations such as areas with high numbers of pedestrian related collisions, low levels of pedestrian level of comfort, or physical barriers including rail crossings, bridges, and freeway interchanges.



Attractors

These are pedestrian-related geographic features likely to attract pedestrians. Examples of these key destinations are schools, transit, community attractions, parks and shopping centers.

Key Categories



Using the criteria and analysis based on the pedestrian priority model, individual pedestrian focus area maps were produced for the entire county. This includes all 34 cities in Orange County, and the major unincorporated areas under the jurisdiction of the County of Orange. The pedestrian focus area maps highlight the likely areas of greatest activity and demand for pedestrian travel. The jurisdictional maps are intended to help local agencies to identify and prioritize implementation of pedestrian infrastructure improvements and better position those agencies for local funding and grant pursuits. Figure E-1 below illustrates the countywide pedestrian priority model forecast. Figure E-2 illustrates a representative City pedestrian priority model forecast for the City of Placentia. Similar maps are provided for each jurisdiction in the Appendix.

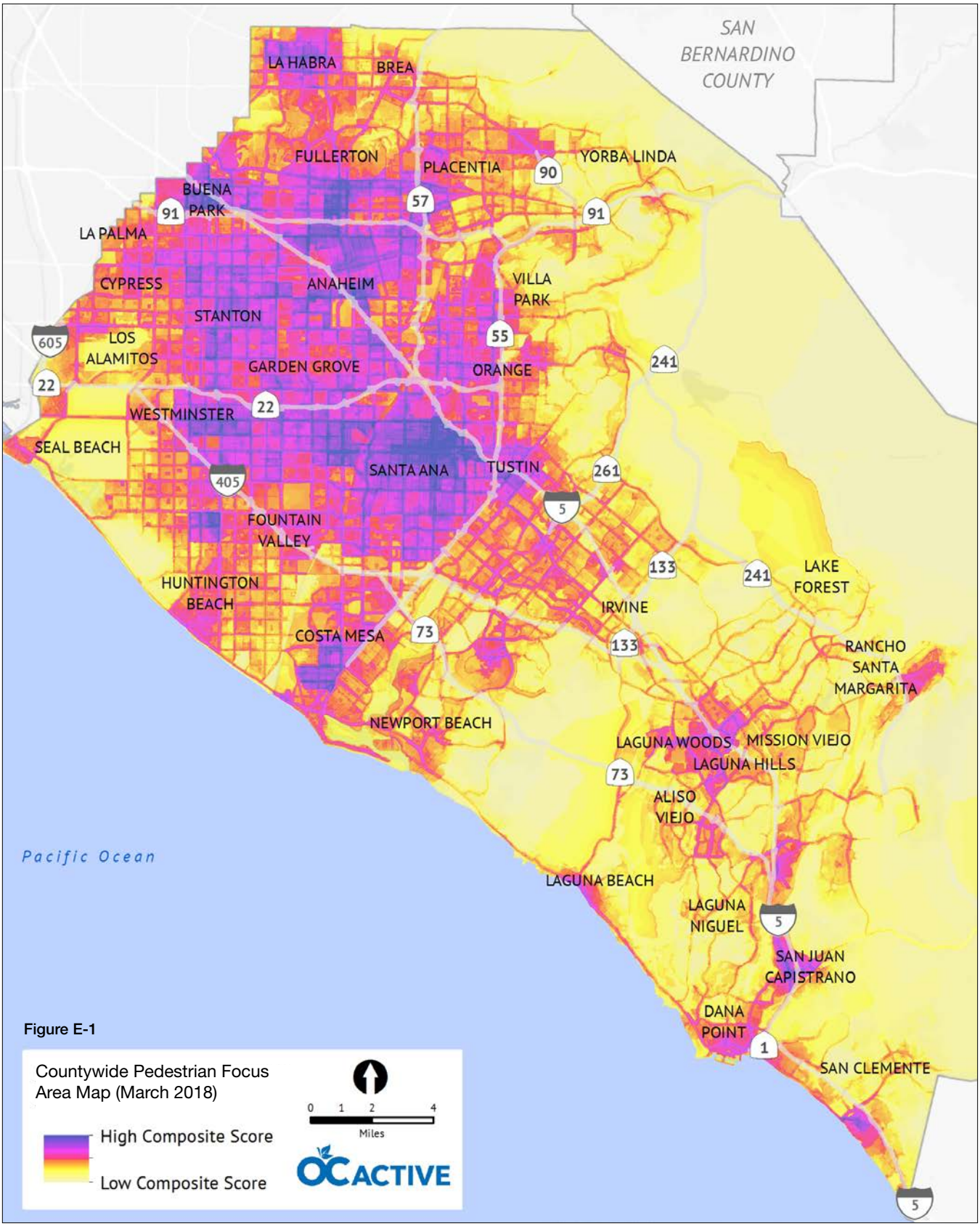

SAN BERNARDINO COUNTY
LA HABRA
BREA
FULLERTON
PLACENTIA
YORBA LINDA
BUENA PARK
LA PALMA
CYPRESS
ANAHEIM
VILLA PARK
STANTON
LOS ALAMITOS
GARDEN GROVE
ORANGE
WESTMINSTER
SEAL BEACH
SANTA ANA
TUSTIN
FOUNTAIN VALLEY
HUNTINGTON BEACH
COSTA MESA
IRVINE
LAKE FOREST
RANCHO SANTA MARGARITA
NEWPORT BEACH
LAGUNA WOODS
MISSION VIEJO
LAGUNA HILLS
ALISO VIEJO
LAGUNA BEACH
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
DANA POINT
SAN CLEMENTE
Pacific Ocean
605
91
57
90
55
241
22
405
5
261
133
73
1
Countywide Pedestrian Focus Area Map (March 2018)
High Composite Score
Low Composite Score
0 1 2 4
Miles
OCACTIVE

Figure E-1

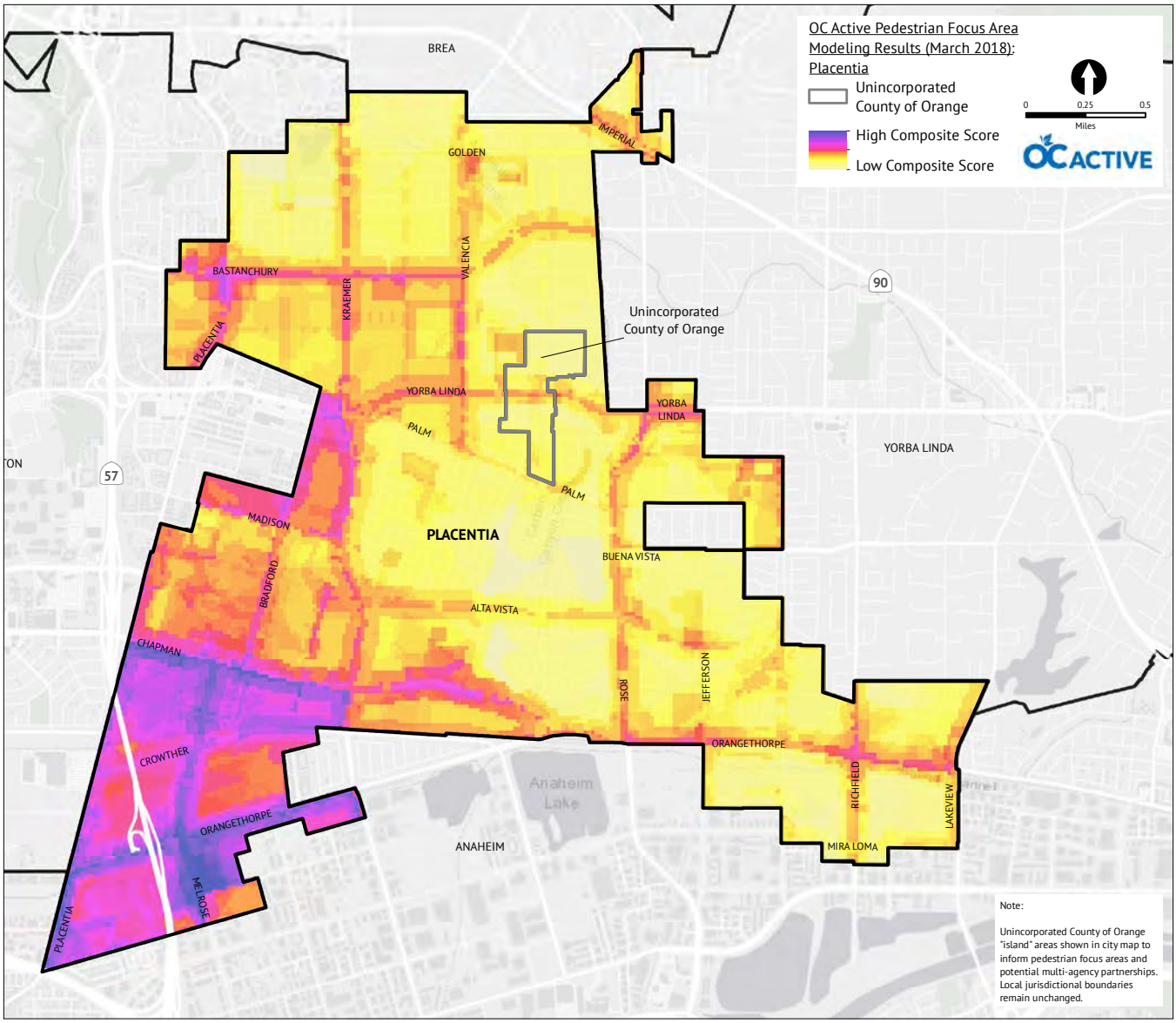


Figure E-2 - City of Placentia Pedestrian Focus Area Map

Bikeways Network

OC Active establishes a comprehensive multi-layered bikeway network consisting of local, regional, and connector facilities. Collectively the implementation of the distributed network will provide access across jurisdictional boundaries connecting to regional destinations as well as local neighborhoods. OC Active maps and includes existing and planned bikeways using the following three key bikeway layers:

- **Local Bikeways:** Each jurisdiction has a locally-adopted set of bikeways that are incorporated into OC Active. Where jurisdictions haven't identified a prioritized list of planned bikeways, the OC Active report provides a list to satisfy state requirements. The planned local bikeways were analyzed and prioritized using a set of defined evaluation criteria that take into account several factors, including cost efficiency, demographics, safety, trip demand, and connectivity with other existing and planned bikeways. The OC Active study doesn't change any locally adopted plans for future bikeways, rather it incorporates local planning into a comprehensive master plan. The OCTA-produced Commuter Bikeways Strategic Plan (2009) was prepared to map local bikeways and is superseded by the OC Active report. Figure E-3 shows the local bikeway network for all local agencies in Orange County.
- **Regional Bikeways:** Between 2011 and 2016, OCTA completed four studies identifying 41 regional bikeway corridors that link to key regional destinations countywide. As shown in Figure E-4, OC Active incorporates all 41 regional bikeways under one cover to minimize need to review four separate documents.
- **Regional Connectors:** During preparation of OC Active, the SWG was asked how the regional bikeways could be leveraged into a successful branded bikeway like the OC Loop. The OC Loop combined several regional bikeways into a large multi-jurisdictional corridor with cohesive branding. The SWG recommended loops and linear corridors that would serve employment centers and access to transit. The OC Active report has linked various regional bikeways into the Orange County Regional Connectors as shown in Figure E-5.

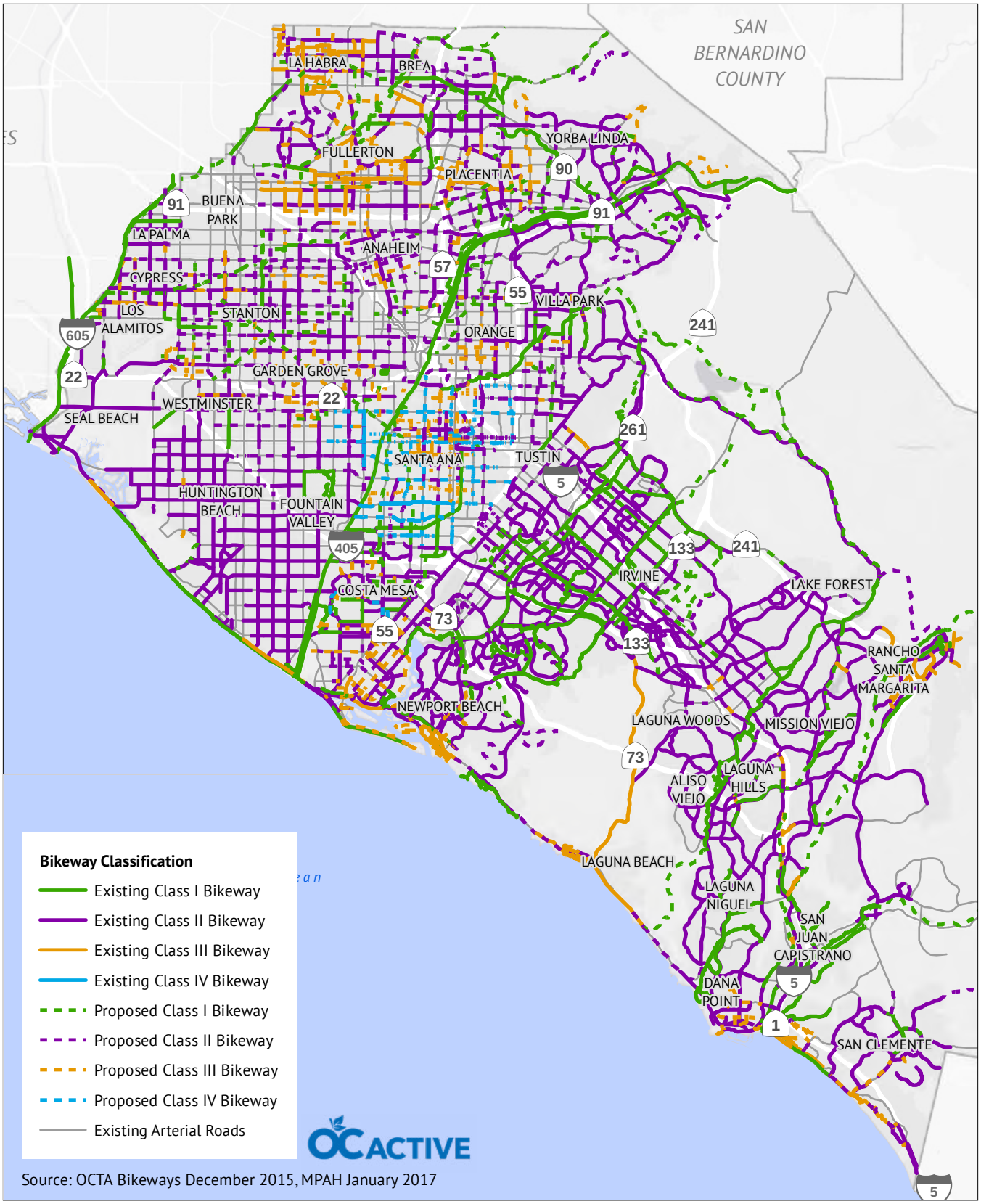


Figure E-3 - Orange County Local Bikeways

Figure E-4 - Orange County Regional Bikeway Corridors

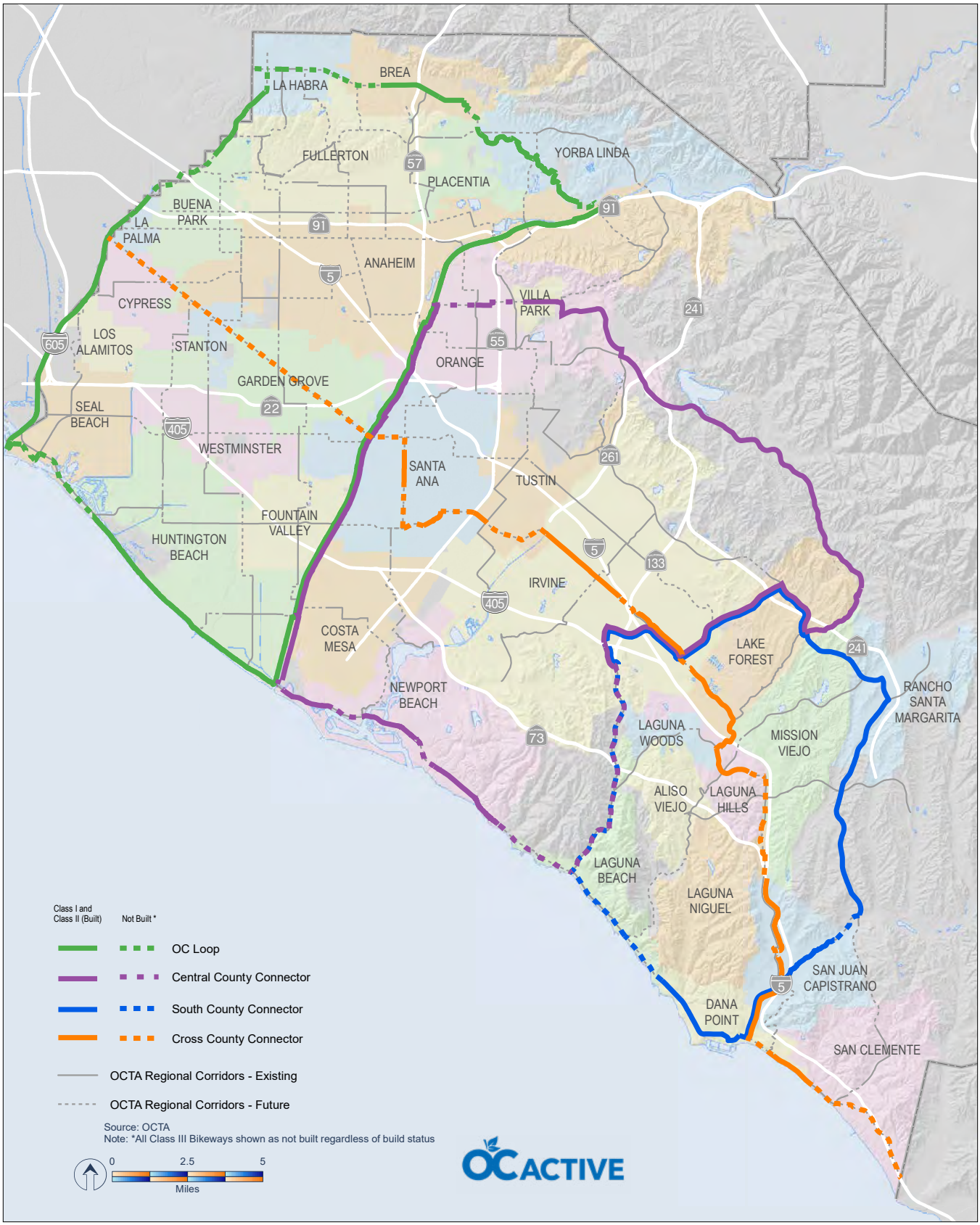


Figure E-5 - Orange County Regional Connectors

Active Transportation Toolkit

To assist local agencies, a comprehensive toolkit has been developed that provides best practices for infrastructure design concepts as well as non-infrastructure methods (education, encouragement, enforcement, and evaluation). The toolkit compiles best practices from public agencies and municipalities nationwide. The toolkit is available for use by OCTA and local agencies throughout Orange County as they endeavor to improve the system across disciplines. The toolkit can be found in the Appendix of this report.

Implementation

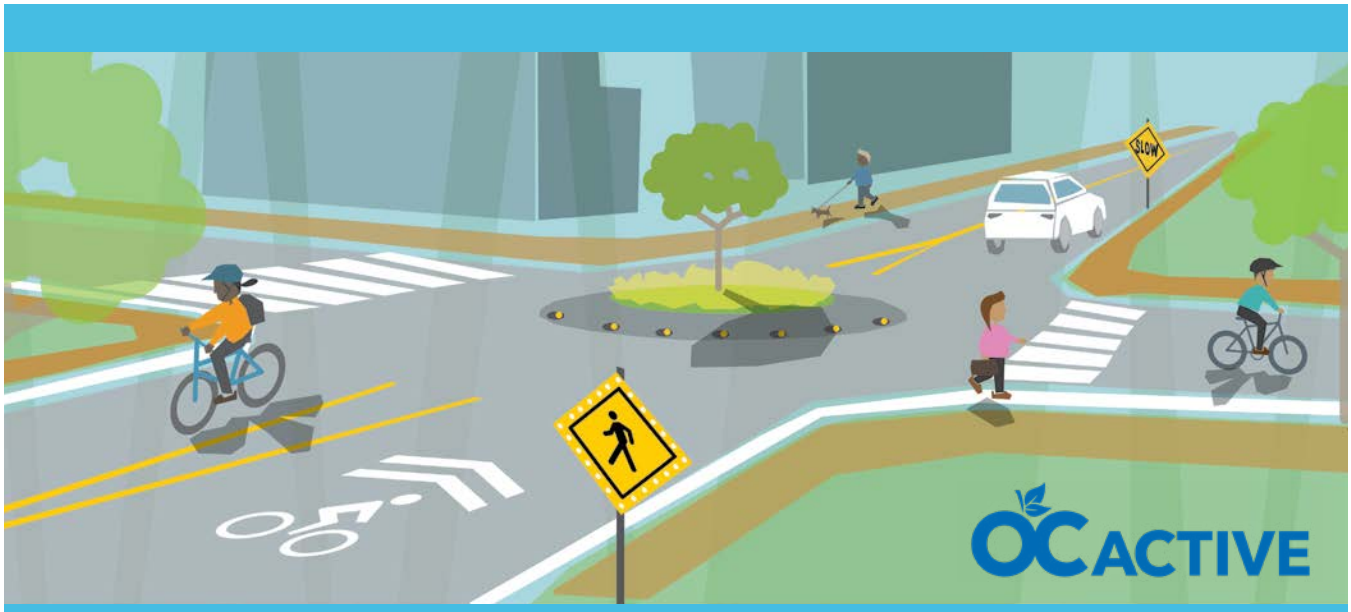
The feedback received through public outreach efforts indicates the public is interested in seeing improvements to the active transportation network serving people walking and biking throughout Orange County. OC Active identifies infrastructure improvements and clarifies roles and responsibilities for future implementation. Overall, implementation is a collaborative process and requires partnerships between local agencies, Caltrans, OCTA, advocates and other stakeholders. A list of recommended actions is provided within the report to continue to improve active transportation infrastructure and programs to address safety countywide.

Funding Strategies

Funding assistance can be provided through federal, state, and local government agency programs aimed at improving active transportation infrastructure. It is important that communities are made aware of funding sources and that the proper procedures are followed to maximize successful grant pursuits. Funding for active transportation projects is highly competitive, so this report provides a summary of funding opportunities by source with details regarding eligibility, use and requirements associated with funding sources.

Consistency with California Transportation Commission Checklist

The California Transportation Commission (CTC) provides a checklist of components to be included in the preparation of active transportation plans funded by the CTC's Active Transportation Program. Per the CTC's requirements, this report provides a checklist identifying where each component is found in OC Active.



0 INTRODUCING OC ACTIVE

OC Active: Orange County's Bike + Ped Plan is the first countywide Active Transportation Plan (AT Plan) for Orange County that addresses both bicycle and pedestrian networks. This plan is intended to serve as a comprehensive countywide plan for bicycle and pedestrian transportation in Orange County. The Orange County Transportation Authority (OCTA) has developed this plan to provide a framework for bikeway and pedestrian planning across Orange County. The plan is developed to be compliant with the Caltrans Active Transportation Program (ATP) guidelines, allowing local cities and the County of Orange to apply for state funding to plan and implement local bicycle and pedestrian projects.

Currently, only a few jurisdictions within Orange County have their own citywide active transportation plans. OC Active provides all cities within Orange County with a comprehensive AT Plan that can serve as the foundation for the pursuit of funding for active transportation project planning and implementation. Further, OC Active helps to promote regional and cross-jurisdictional bikeway and pedestrian planning across Orange County.

The introductory section of the plan provides an overview of the background and context for this planning document, presents the objectives of the plan, summarizes the goals identified by OCTA at the outset of this planning effort, and identifies the subsequent sections of this planning document.

0.1 Background and Context

OCTA is the regional transportation planning agency for Orange County, and has led the development of regional bicycle plans for the county for more than two decades. The Commuter Bikeways Strategic Plan (CBSP), updated most recently in 2009, has previously served as the countywide resource for existing and planned bikeways in Orange County. More recently, OCTA was the lead agency for the development of regional bikeway plans for each of the supervisorial districts in Orange County. These plans, created between 2012 and 2016, identified 41 regional bikeway corridors that would connect cities located throughout the county.

Recent years have seen the initiation and expansion of the State ATP grant funding program, coinciding with an increased interest locally in Orange County to improve safety and mobility for both bicyclists and pedestrians, as well as statewide and regional goals to reduce greenhouse gas emissions. These factors create the right conditions for OCTA to initiate a new effort to not only update the 2009 CBSP, but to create a comprehensive, countywide AT Plan that would help to assemble countywide planning efforts related to bicycle and pedestrian transportation. This plan would also serve as an ATP-compliant document for OCTA and cities throughout Orange County to utilize to pursue grant funds available through the state ATP funding program.

The preparation of this plan was funded through a State ATP 2016 (cycle 2) grant. The plan content and recommendations reflect input received from the community, each of the 34 cities, the County of Orange, and Caltrans District 12.

Geographic Context

As shown in Figure 0.1, Orange County is a diverse and growing county of more than 3.2 million residents. Geographically, the physical landscape of the county presents a wide range of opportunities and challenges related to the planning and implementation of active transportation infrastructure. Distinctive geographic areas within the county include the following:

COASTAL ORANGE COUNTY

The Pacific Ocean serves as the western boundary of Orange County, creating a natural attraction for active transportation trips along the full length of the county. The topography in this zone creates some challenges for active transportation mobility, but the accessibility of the beach and compact development patterns present in many of the cities located along the coast creates attractive areas to walk and cycle.

NORTHWEST AND CENTRAL ORANGE COUNTY

This portion of Orange County is distinguished by a large, flat coastal plain with near-continuous development in suburban and urban densities. The flat topography is conducive to traveling via walking and cycling, and the interconnected arterial street grid, as well as the existing river and flood control channels present opportunities for efficient movement via active modes.

NORTHERN FOOTHILLS

The northern portion of the county is characterized by rolling hills and suburban development patterns. These conditions can create challenges for active transportation mobility, but the existing and planned active transportation network is intended to support travel via these modes.

SOUTHERN COASTAL FOOTHILLS

Similar to the northern portions of the county, the southern section of Orange County also includes hilly terrain and suburban development patterns. The area includes several master planned communities, which have created extensive networks of bicycle and pedestrian infrastructure.

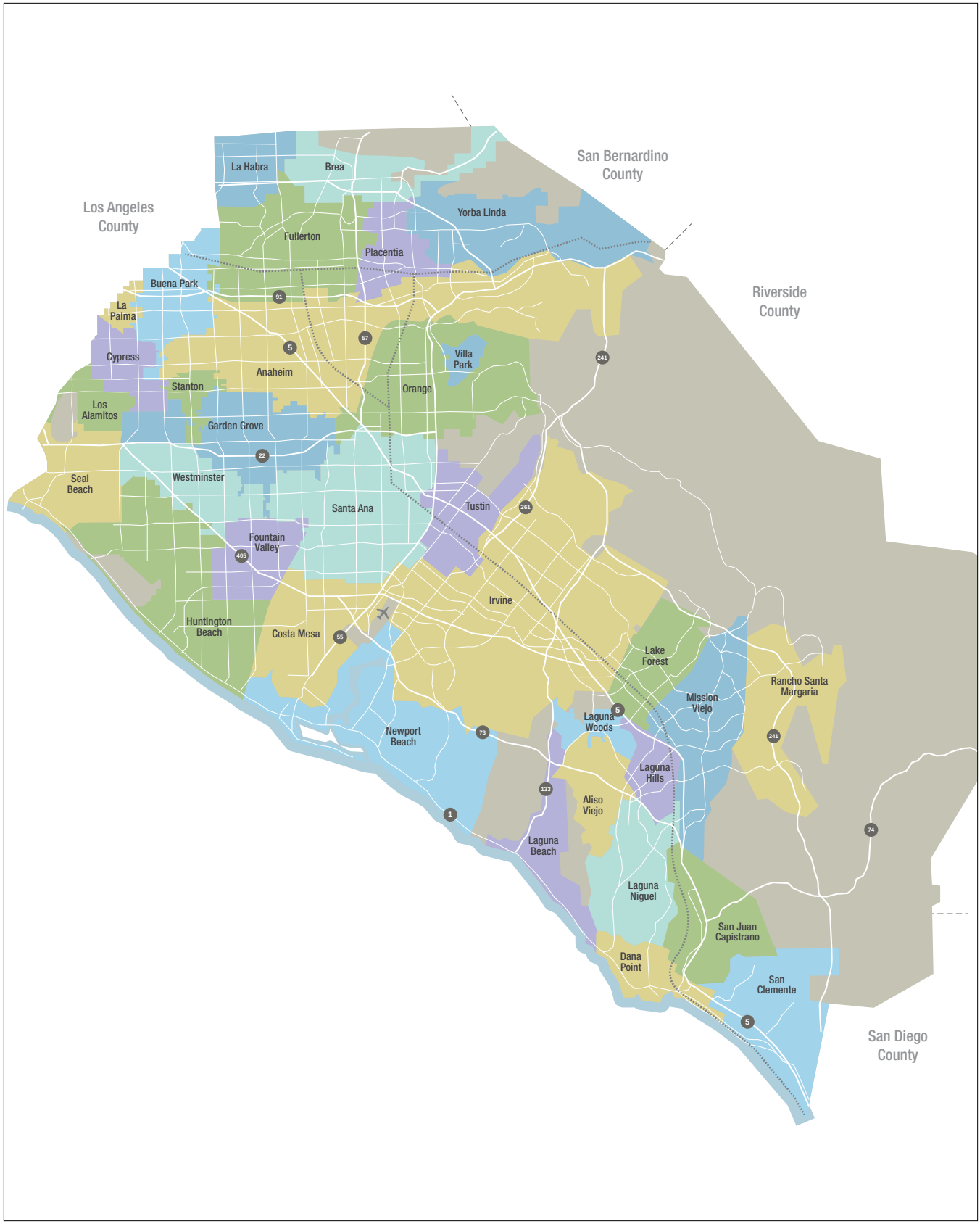


Figure 0.1 - Map of Orange County

0.2 Plan Goals

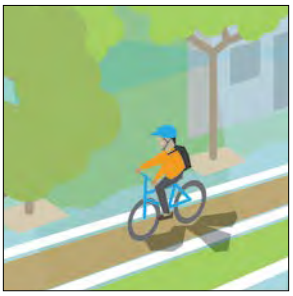
In the context Orange County's diverse population, geography, and mobility needs described above, it was essential to define the goals for OC Active early in the plan development effort. This approach allowed the project team to ensure the technical work and community outreach efforts align with established goals for use in development of the planning document.

Seven distinct goals were identified to guide decision making during the preparation of the plan. The goals help to ensure OC Active supports regional mobility needs and empowers local jurisdictions to provide a responsive transportation network. During the development process, these goals were discussed with the OC Active Stakeholder Working Group (SWG), the Orange County Council of Governments (OCCOG) Technical Advisory Committee, OCTA's Technical Advisory Committee, and the Citizens Advisory Committee Bike and Pedestrian Subcommittee.

The seven OC Active goals are:

1 REDUCE PEDESTRIAN & BICYCLIST COLLISIONS

OCTA and local agencies in Orange County are very interested in reducing the number of fatal and serious injury collisions involving bicyclists and pedestrians. Continued investment in the active transportation network will also close gaps in the system and address challenges for improved safety.



2 ADVANCE STRATEGIC WALKING & BIKING NETWORK

Bicycle and pedestrian facilities that provide safe and convenient access to major destinations, schools, and parks are essential to maintaining Orange County's high quality of life. Facilities that connect multiple cities are also important to increase mobility and encourage use of active transportation modes.

3 ENHANCE WALKING & BIKING ACCESS TO TRANSIT

As the regional transit operator in Orange County, OCTA is interested in improving access to transit for residents throughout Orange County, helping to improve mobility and increase transit ridership.

4 IMPROVE HIGH-NEED PEDESTRIAN AREAS

The plan identifies areas throughout Orange County where the need for improved pedestrian infrastructure is high compared to the county as a whole. Mapping the pedestrian realm high need areas will help guide investment for improved mobility, safety, and equity.

5 STRENGTHEN STAKEHOLDER PARTNERSHIPS

OC Active builds on a history of OCTA, the County, local cities, and community stakeholder groups cooperating together to plan and implement regional bicycle and pedestrian infrastructure. This plan identifies strategies and opportunities to continue and strengthen these partnerships going forward.

6 INCORPORATE DIVERSE COMMUNITY PERSPECTIVES

The community outreach effort focused on connecting with residents throughout Orange County. The plan strategies and recommendations are strengthened by the diverse and widespread input received during the project engagement with the community.

7 LEVERAGE FUNDING OPPORTUNITIES

OCTA is focused on helping local cities to pursue and obtain grant funding to support the planning, design, and construction of the active transportation improvements identified in OC Active. This plan will serve as the foundation for local agencies to pursue funding opportunities for project implementation.

0.3 Elements of OC Active

OC Active has been organized around the following six topics:

1

SUMMARY OF COMMUNITY OUTREACH

This section presents a review and the highlights of the community outreach effort conducted during the development of the OC Active plan. Outreach efforts included attendance at community events to receive survey input, a chalk, walk, and roll school art contest, joint OCTA-local police events, and walk to school day events with local elementary schools. The plan development process was also supported by input received from the project Stakeholder Working Group (SWG), which was comprised of city staff, non-profit staff, college/university staff, and local non-profit advocates.

2

EXISTING CONDITIONS FOR ACTIVE TRANSPORTATION

OC Active provides a comprehensive snapshot of the existing conditions associated with bicycle and pedestrian infrastructure in Orange County. This section discusses the major components of the existing active transportation network.

3

PEDESTRIAN NETWORK

OC Active is the first countywide planning document to examine pedestrian transportation needs and opportunities. The inputs and detailed criteria used to conduct the pedestrian needs analysis, the analysis approach, and the results of the analysis are presented in this section.

4

BICYCLE NETWORK

To enhance bicycle transportation, OC Active is focused on identifying and prioritizing local bikeway improvements throughout Orange County. This plan also incorporates the regional bikeway planning efforts previously completed by OCTA and identifies the next steps to promote regional bikeway project implementation.

5

ACTIVE TRANSPORTATION SUPPORTING PROGRAMS

A summary of programs related to education, encouragement, and enforcement currently in place in cities throughout Orange County. The plan recommends additional programs for consideration.

6

IMPLEMENTATION AND FUNDING

With the completion of OC Active, cities throughout Orange County will be able to use the plan as resource for grant funding pursuits for project implementation. This section discusses available funding sources, order of magnitude costs for various types of active transportation improvements, and actions for cities and OCTA to follow for project implementation.

The appendix provided with OC Active includes a wealth of information beyond that identified above. The contents of the appendix include the complete Community Outreach summary report, the full Exiting Conditions Technical Memorandum, and the active transportation toolbox, which identifies a range of tools, strategies and programs organized around the 5 “E’s” that can be used to implement and promote active transportation infrastructure, mobility, and safety in Orange County.

0.4 Consistency with California Transportation Commission Checklist

The California Transportation Commission (CTC) provides a checklist of components to be included in the preparation of active transportation plans funded by the CTC's Active Transportation Program. Per the CTC's requirements, the checklist below identifies where each component is found in OC Active, or an explanation of why the component is not applicable.

Table 0.1 CTC Compliance Checklist

CHECKLIST ITEM	STATUS	CORRESPONDING PLAN SECTION
A) Mode Share: The estimated number of existing bicycle trips and pedestrian trips in the plan area, both in absolute numbers and as a percentage of all trips, and the estimated increase in the number of bicycle trips and pedestrian trips resulting from implementation of the plan.	✓	Section 2.5 Note: Comprehensive Countywide counts are not available. However, OCTA inventories data where collected by local agencies.
B) Description of Land Use/Destinations: A map and description of existing and proposed land use and settlement patterns which must include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, major employment centers, major transit hubs, and other destinations. Major transit hubs must include, but are not limited to, rail and transit terminals, and ferry docks and landings.	✓	Section 2.6; Appendix Note: Countywide proposed land uses were not available at this time of this plan.
C) Pedestrian Facilities: A map and description of existing and proposed pedestrian facilities, including those at major transit hubs and those that serve public and private schools.	✓	Section 3.2; Appendix
D) Bicycle Facilities: A map and description of existing and proposed bicycle transportation facilities, including those at major transit hubs and those that serve public and private schools.	✓	Section 4.0; Section 4.2; Section 4.3; Appendix
E) Bicycle Parking: A map and description of existing and proposed end-of-trip bicycle parking facilities. Include a description of existing and proposed policies related to bicycle parking in public locations, private parking garages and parking lots and in new commercial and residential developments. Also include a map and description of existing and proposed bicycle transport and parking facilities for connections and use of other transportation modes. These shall include, but not be limited to, bicycle parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	✓	Section 2.3 Note: Comprehensive bicycle parking data is not available.

CHECKLIST ITEM	STATUS	CORRESPONDING PLAN SECTION
F) Wayfinding: A map and description of existing and proposed pedestrian facilities, including those at major transit hubs and those that serve public and private schools.	✓	Section 2.4
G) Non-Infrastructure: A description of existing and proposed bicycle and pedestrian education, encouragement, and evaluation programs conducted in the area included within the plan. Include efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the law impacting bicycle and pedestrian safety, and the resulting effect on collisions involving bicyclists and pedestrians.	✓	Section 5.1
H) Collision Analysis: The number and location of collisions, serious injuries, and fatalities suffered by bicyclists and pedestrians in the plan area, both in absolute numbers and a percentage of all collisions and injuries, and a goal for collision, serious injury, and fatality reduction after implementation of the plan.	✓	Section 2.7 Note: Since this is a countywide plan and the OCTA is the planning agency for Orange County, OCTA does not have authority over implementation of ATP improvements in the plan. Therefore, it is difficult to quantify a collision reduction goal when the adopting agency does not oversee implementation. Furthermore, local jurisdictions will establish custom goals for collision reductions that would be difficult to quantify in this plan.
I) Equity Analysis: Identify census tracts that are considered to be disadvantaged or low-income and identify bicycle and pedestrian needs.	✓	Section 4.1; Appendix Note: Prioritization modelling incorporates CalEnviroscreen 3.0 to identify disadvantaged communities, explained in Section 4.1.
J) Community Engagement: A description of the extent of community involvement in development of the plan, including disadvantaged and underserved communities.	✓	Section 1
K) Coordination: A description of how the Plan has been coordinated with neighboring jurisdictions, including school districts within the plan area, and is consistent with other local or regional transportation, air quality, or energy conversation plans, including, but not limited to, general plans and a Sustainable Community Strategy in a Regional Transportation Plan.	✓	Section 1.4; Section 4

CHECKLIST ITEM	STATUS	CORRESPONDING PLAN SECTION
L) Prioritization: A description of the projects and programs proposed in the plan and a listing of their priorities for implementation, including the methodology for project prioritization and a proposed timeline for implementation.	✓	Section 4.2; Appendix
M) Funding: A description of future financial needs for projects and programs that improve safety and convenience for bicyclists and pedestrians in the plan area. Include anticipated cost, revenue sources and potential grant funding for bicycle and pedestrian uses.	✓	Section 6.2
N) Implementation: A description of steps necessary to implement the plan and the reporting process that shall be used to keep the adopting agency and community informed of the progress being made in implementing the plan.	✓	Section 6.3
O) Maintenance: A description of the policies and procedures for maintaining existing and proposed bicycle and pedestrian facilities, including, but not limited to, the maintenance of smooth pavement, ADA level surfaces, freedom from encroaching vegetation, maintenance of traffic control devices including striping and other pavement markings, and lighting.	✓	Section 6.1
P) Resolution: A resolution showing adoption of the plan by the city, county or district. If the active transportation plan was prepared by a county transportation commission, regional transportation planning agency, MPO, school district or transit district, the plan should indicate the support via resolution of the city(s) or county(s) in which the proposed facilities would be located.	N/A	Not applicable given OCTA is the regional transportation planning agency and does not have governance over local active transportation networks.

This page intentionally left blank.

1 COMMUNITY OUTREACH

The overall approach to community outreach and community involvement for OC Active was focused on the following objectives:

- Attend established community events and create unique engagement opportunities at many events instead of hosting a limited number of open house events.
- Conduct outreach with geographic representation throughout the County.
- Maximize participation in events that were located in disadvantaged communities and/or that had a health and wellness purpose.
- Provide unique family-friendly events in collaboration with health, education, and law enforcement partners.

Consistent with state requirements and project goals, a robust program of public engagement was developed to solicit community input and promote the project efforts by OCTA. Public engagement occurred between February 2017 and October 2018. Feedback was solicited on active transportation needs and priorities to help inform the analysis. The project team reached out to Orange County residents through numerous outreach events and surveys as described below:

- Completed two online public surveys related to walking and biking, resulting in over 1,500 responses
- Hosted project website and social media presence using project branding (OC Active)
- Attended 76 community events and festivals for survey input and promotion through the Summer and Fall of 2017
- Developed the Chalk, Walk & Roll Contest where elementary, middle, and high schools could win a donated skateboard or bicycle rack through artwork submission in Fall 2017
- Partnered with the Anaheim Police Department for the "Cruise with a Cop" community safety event at Maxwell Park in the City of Anaheim on March 24, 2018.
- Partnered with Orange County Healthcare Agency, local cities, schools, and law enforcement to facilitate the Walk to School Day participation by five local elementary schools on October 10, 2018

Key Emerging Themes

As a result of this engagement, the public shared significant input to inform the development of OC Active. At our various public engagement activities, the public noted strong interest and support for providing enhancements to encourage bicycle and walking activities throughout the county. Many participants were interested in learning when they could expect improvements and enhancements in their community. A number of participants expressed the desire to see improvements soon as a means to addressing safety concerns within their communities. The following emerging themes were conveyed during public engagement:

- Interest in better connections to parks, downtown areas, schools, jobs & retail centers, and transit.
- Preference for more and improved crosswalks, better nighttime lighting, and more shade/landscaping for people walking.
- Preference for separated bikeways and buffered bike lanes for people bicycling.
- Desire for educational campaigns addressing motorist, pedestrian, and bicyclist behaviors including safety concerns.
- Request for an online portal providing maps and information on bike facilities and biking events.

Each of the main outreach activities is highlighted in this section. A complete summary report of the outreach process, survey results, and summary of input received is provided in the Appendix.

1.1 Outreach Events

To promote the "OC Active" online survey (Typeform) between August 2017 and December 2017, the project team hosted seventy-six (76) project booths at community events, festivals, and meetings throughout OC. The project team's attendance at events was promoted through the project Facebook page: https://www.facebook.com/OCActive. The project team also posted pictures of public interaction at events on the Facebook page. At each event, the project team informed the public of the OC Active strategy and provided tablets for individuals to participate in the survey. At each booth, the project fact sheet and OC Bikeway Guide were distributed. The project team also displayed OCTA branded giveaways to attract more visitors to the booth and incentivize them to complete the survey. Figure 1.1 is a density map showing where the outreach team attended events with concentration in state-designated disadvantaged communities.

The complete OC Active Outreach Report is provided in the Appendix and includes a table listing all of the events attended.

1.2 Online Outreach

In addition to the in-person community events, the outreach effort for OC Active included a robust online and social media presence. OCTA hosts an OC Active page on their website, where project materials and information were posted for public access. OCTA also established and maintained a Facebook page for OC Active. Photos from various community events and project outreach were posted on the Facebook page to publicize the events. The voting for the Chalk, Walk & Roll contest was also conducted through the Facebook page.

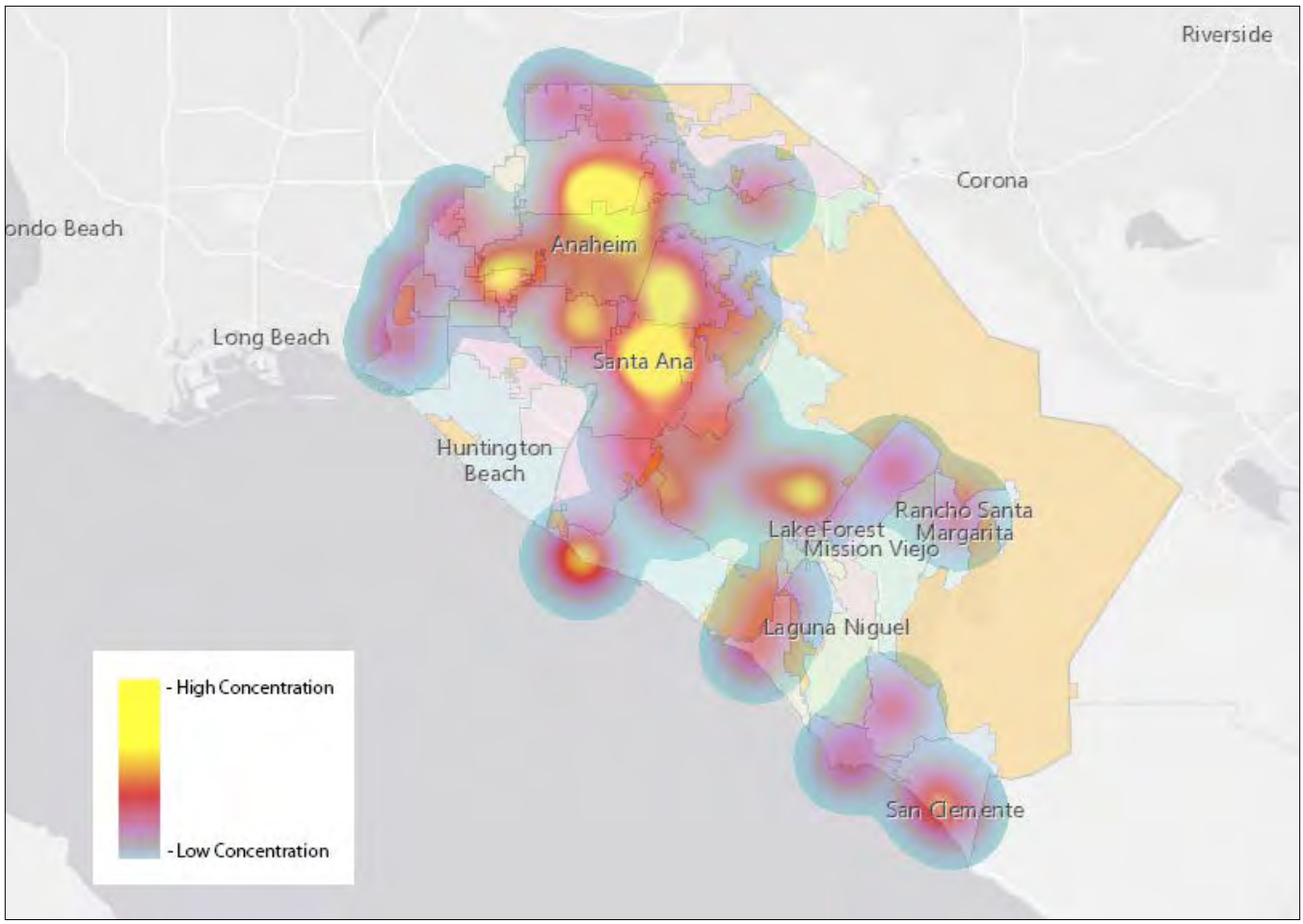


Figure 1.1 – Event Density Map

1.3 Community Survey

In May 2017, OCTA launched an online, interactive survey to engage the public in areas and methods for improvement to the pedestrian realm. The survey was promoted on the OC Active Facebook page and through OC Active booths at the outreach events mentioned in Section 1.1. Over a span of approximately eight months, the project team collected over 1,300 responses through the survey. The survey included questions on general and specific areas to improve pedestrian travel. A total of 418 participants provided their email for further project updates. In addition, upon completion of the online survey, visitors were forwarded to an interactive map where they could pinpoint specific locations in OC and provide comments.

Please see the Outreach Report in the Appendix for a full breakdown of survey results. Figure 1.2 highlights the results of the 2017 community survey.

In September 2018, OCTA launched a second, interactive survey with questions pertaining to both pedestrian and bikeway improvements. The survey was promoted on the OC Active Facebook page, through OC Active booths at outreach events listed in Chapter 2.12 and through the Stakeholder Working Group. Over a span of approximately two months, the project team collected approximately 450 responses to the 2018 community survey. The survey included questions on bikeway and pedestrian investment preferences, biking habits, and factors that discourage biking. 68 participants provided their email for further project updates.

The 2018 survey found that respondents prioritized investment in:

- Separated bikeways over other bikeway types
- Physical improvements to both bicycle and pedestrian facilities
- Pedestrian improvements such as more time to cross at traffic signals and wider sidewalks
- Educational programs that include safe driving, bicycling, and walking behavior.

With regards to biking habits, most respondents:

- Ride their bike recreationally
- Ride their bike 3 miles or less one way.
- Prefer a cruiser bike or comfort bike

The survey also found that the top two factors that discourage biking were related to cars. Over half of respondents were either not comfortable next to traffic or worried about motorist speeds. Please see the Appendix for a full breakdown of the 2018 survey results.

Figure 1.2 – 2017 Community Survey Results

1.4 Stakeholder Working Group

A key element of the community outreach effort was the formation of a Stakeholder Working Group (SWG). The SWG included invitees consisting of Caltrans, city and county staff (both planning and engineering), local active transportation advocates, and public health advocates. The composition of the SWG membership was intended to be broad and inclusive to a wide variety of backgrounds, interests, and professional roles. This helped to ensure that a diversity of perspectives and opinions were provided and heard during the development of OC Active.

Key goals for the SWG included the following:

1. Provide recommendations on technical and strategic decision points during development of OC Active.
2. Identify potential outreach activities for engagement with the public to solicit input on the survey tool.
3. Promote OC Active to membership lists.

SWG members consisted of the following organizations:

Government:

1. City of Aliso Viejo
2. City of Anaheim
3. City of Brea
4. City of Buena Park
5. City of Costa Mesa
6. City of Garden Grove
7. City of Huntington Beach
8. City of Irvine
9. City of La Habra
10. City of Lake Forest
11. City of Newport Beach
12. City of Santa Ana
13. City of Tustin
14. City of Villa Park
15. City of Yorba Linda
16. Caltrans
17. OC Parks
18. OC Public Works
19. OC Health Care Agency
20. OC Department of Education
21. Orange County Council of Governments

Community Organizations and Service Providers:

22. Alliance for a Healthy Orange County
23. Blue Shield
24. Orange Coast College Food Riders
25. OC Department of Education
26. Safe Routes to School National Partnership
27. St. Jude Medical Center

Industry and Community Groups:

28. California Bicycle Coalition
29. Irvine Bicycle Club
30. OCTA Citizens Advisory Committee Bicycle/ Pedestrian Subcommittee
31. Orange County Bicycle Coalition
32. Orange County Wheelman
33. People for Housing
34. Santa Ana Active Streets

The SWG met three times during the development of OC Active. A summary of the agenda and key outcomes of these three meetings is provided in the following subsections.

1.4.1 SWG Meeting #1

The first SWG meeting was conducted in September 2017. This meeting provided attendees with an overview of the OC Active goals and objectives, the project schedule, and key element of the work scope. Discussion with the SWG members focused on the criteria that would be utilized for the pedestrian focus modeling and identification of areas of emphasis for pedestrian improvements throughout Orange County and on a city-by-city basis. The project team also provided an update on the status of the community outreach effort.

1.4.2 SWG Meeting #2

The second SWG meeting occurred in February 2018. Agenda topics for this meeting included a review of the finalized pedestrian modeling criteria, an overview of proposed regional bikeways and requests for comment from attendees, and a review of the outline for the bicycle and pedestrian best practices toolkit that would be included within OC Active. The project team also presented a summary of the completed outreach efforts conducted in 2017.

1.4.3 SWG Meeting #3

The final SWG meeting occurred in May 2018. This meeting discussed draft criteria for the prioritization of local bikeways projects, order of magnitude cost estimates prepared by the project team for bicycle and pedestrian improvements, the proposed regional bikeway network and combined projects, funding opportunities for active transportation improvements, and a review of completed and pending outreach efforts.

1.5 Chalk, Walk & Roll Contest

To promote project awareness and to encourage safe walking and bicycling, the project team developed an art contest for Orange County schools. All elementary, middle and high schools located in Orange County were eligible to participate in the contest. Contestants were asked to design and implement a chalk drawing reflecting the “walk and roll” theme at their school and submit photographs online to enter the contest. The winning schools were determined by the number of votes received on social media (OC Active Facebook Page).

646 schools were invited to participate in the chalk contest with seven (7) schools submitting entries in two categories. The winners for high school and middle school contests received 426 and 313 Facebook votes respectively. The project Facebook page was utilized extensively to promote the contest through frequent promotional posts and paid advertisements. In addition to the art contest, the online community survey was promoted on the project Facebook page as well, which resulted in directing many contest participants to the survey page. Based on the survey results, 5% of survey participants were from the “under 18” age group; significantly higher than the average for this age group which is typically around 1%.

Figure 1.3 is an infographic highlighting the Chalk, Walk & Roll Contest and OC Active Facebook page activities.

1.6 Cruise with a Cop Event

Enhancing the partnership between police departments in Orange County and the community was another key objective of the OC Active community outreach effort. To encourage safe walking and bicycling, the project team partnered with the Anaheim Police Department, Orange County Health Care Agency (OCHCA), and the City of the Anaheim Community Services Departments to hold the Cruise with a Cop event at Maxwell Park in Anaheim. Direct outreach was conducted to the closest five elementary schools with take home flyers for the approximate 4,000 attending students. In addition, the project team coordinated flyer placement at Maxwell Library, direct signage along the bike paths and trail around the park, and a promotional banner at the baseball field at Maxwell Park. Moreover, the project Facebook page and Anaheim's PD Facebook page were utilized to promote the event through frequent promotional posts.

The event took place on Saturday March 24th, 2018, and over 75 kids and parents participated. The project team set up five (5) activity stations at Maxwell Park. The Anaheim Police Department had a free helmet station to distribute helmets funded by the state Office of Traffic Safety. Approximately 50 helmets were distributed to youth attending the event. Anaheim Community Services also set up an informational booth giving out information about community events. At the OCHCA booth, kids learned about helmet safety by taking part in an activity where they could drop an egg into a bucket to demonstrate how helmets would protect their head. The project team had two stations. At the first station, they discussed the OC Active plan and general OCTA information. The second station was an activity station where kids could decorate their new helmets with stickers and paint. At the activity station there was also a giant vinyl of a bus, provided by OCHCA, where kids decorated and painted images related to active transportation. These activities were followed with a bike cruise around Maxwell Park led by the Anaheim PD's traffic mascot, Oscar el Oso.

The Outreach Report in the Appendix includes more photographs of the Cruise with a Cop event and promotional Facebook posts.

Figure 1.3 – Chalk, Walk & Roll OC Active Contest

1.7 Walk to School Day Events

To collect more feedback on pedestrian and bikeway improvements while raising the awareness of the OC Active Project, the project team partnered with the Orange County Health Care Agency (OCHCA) to participate in the annual International Walk to School Day, which promotes walking or biking to school. The project team engaged with five (5) schools across Orange County:

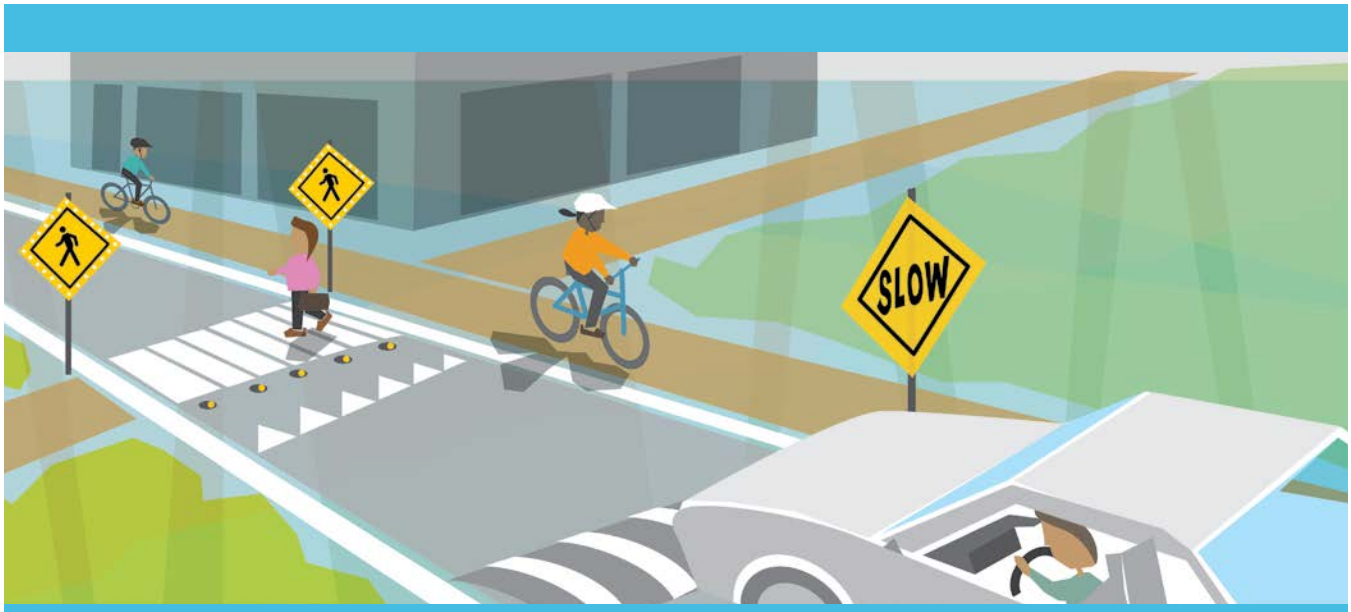
- Diamond Elementary School, City of Santa Ana
- Rossmoor Elementary, Unincorporated County of Orange (Rossmoor)
- Benson Elementary School, Unincorporated County of Orange (Tustin)
- Los Positas Elementary School, City of La Habra
- San Juan Elementary School, City of San Juan Capistrano

To promote the Walk to School events, the project team developed a take-home flyer and a media release for each school. In addition, a social media toolkit was prepared that provided ready-made social media text for schools to promote the event on their Facebook and Twitter pages.

The events took place on Wednesday, October 10, 2018, and over 500 students and parents participated across the five schools. Students, teachers, parents, law enforcement and community members met at nearby parks before walking a few blocks to their respective schools. At each of the schools, the project team set up a table with general OCTA information, OC Active fact sheets, and project materials to engage with school faculty, youth and parents as they arrived on campus. Display-board versions of the “OC Active Rolling and Walking Survey” were displayed. Students and parents were encouraged to complete the survey using sticker voting or digital entry on tablets.

The Outreach Report in the Appendix includes pictures of the Walk to School events and promotional items.

This page intentionally left blank.



2 EXISTING CONDITIONS

2.1 Sidewalks/Pedestrian Facilities

Existing pedestrian infrastructure contributes to the ability of residents to walk to their destinations. This section discusses existing sidewalk inventory as well as analysis of the level of comfort that pedestrians would experience walking along specific corridors throughout Orange County. Note that the term pedestrian is used to describe any person traveling in the pedestrian realm. This includes, but is not limited to, pedestrians, wheelchair users, mobility-assisted users, and skateboarders.

2.1.1 Summary of Existing Pedestrian Conditions

Pedestrian facilities located throughout Orange County offer convenient access to a range of destinations, including employment, schools, recreation, and healthcare. Existing pedestrian facilities include sidewalks, multi-use trails, pedestrian bridges, and pathways that serve residents throughout the county. Sidewalks and other pedestrian facilities also provide important connections to transit stops. Pedestrian conditions can vary throughout the 35 different local jurisdictions in the county. By understanding existing conditions related to pedestrian comfort and safety, we can begin to identify areas that could benefit from enhancements to pedestrian infrastructure.

2.1.2 Pedestrian Level of Comfort

In addition to the existence of sidewalks, pedestrians experience various other factors that can contribute to their sense of safety and comfort in walking to their destinations. Analysis of Pedestrian Level of Comfort (PLOC) was conducted to determine the Master Plan of Arterial Highways (MPAH) corridors most suitable for pedestrian travel in the region as well as identify challenge areas. The factors considered in this analysis included:

- Average Daily Traffic (ADT)
- Road classification
- Number of lanes
- Missing sidewalks
- Sidewalks with no buffers
- Sidewalks with one separation (on-street parking, bike lanes)
- Sidewalks with multiple separations (on-street parking, bike lanes)

Utilizing an ATP 2015 grant, OCTA was able to inventory sidewalks on MPAH designated roadways and other key roadways with bikeways or near train stations. The sidewalk inventory was developed in a Geographic Information System (GIS) database and provided valuable information for OC Active pedestrian analysis.

An evaluation system was created for OC Active to evaluate roadways using scoring ranges shown in Tables A.1 through A.4 in the Appendix. This analysis approach was originally developed by the Mineta Transportation Institute in 2012 and was augmented significantly to include ADT values, road classification, and a variety of sidewalk types. Although speed would have been a more desirable attribute to use for this modeling as it has a stronger correlation with pedestrian safety, it was not available in GIS format for the entire study area. Roadway classification was only used for a few segments that did not have recorded ADT values. The project team originally developed this PLOC scoring methodology in support of an urban trails project in Southern California and has validated and refined the scoring tables based on numerous applications of the model. The results of this analysis can be used to identify high-stress areas that could benefit from improvements to the pedestrian environment as well as low stress routes.

Figure 2.2 displays the results of the PLOC analysis. Lower levels of PLOC indicate corridors that are suitable for most pedestrians, including children, while higher levels indicate corridors that are suitable for the fewer number of pedestrians who will walk in nearly any setting. Results are very similar to the bicycle level of traffic stress analysis results in the next section, but demonstrate a lower level of comfort in traveling by walking as compared to biking. Fewer opportunities for alternative pedestrian routes exist as compared to the bicycle results, indicating a need for increased focus on the pedestrian environment.

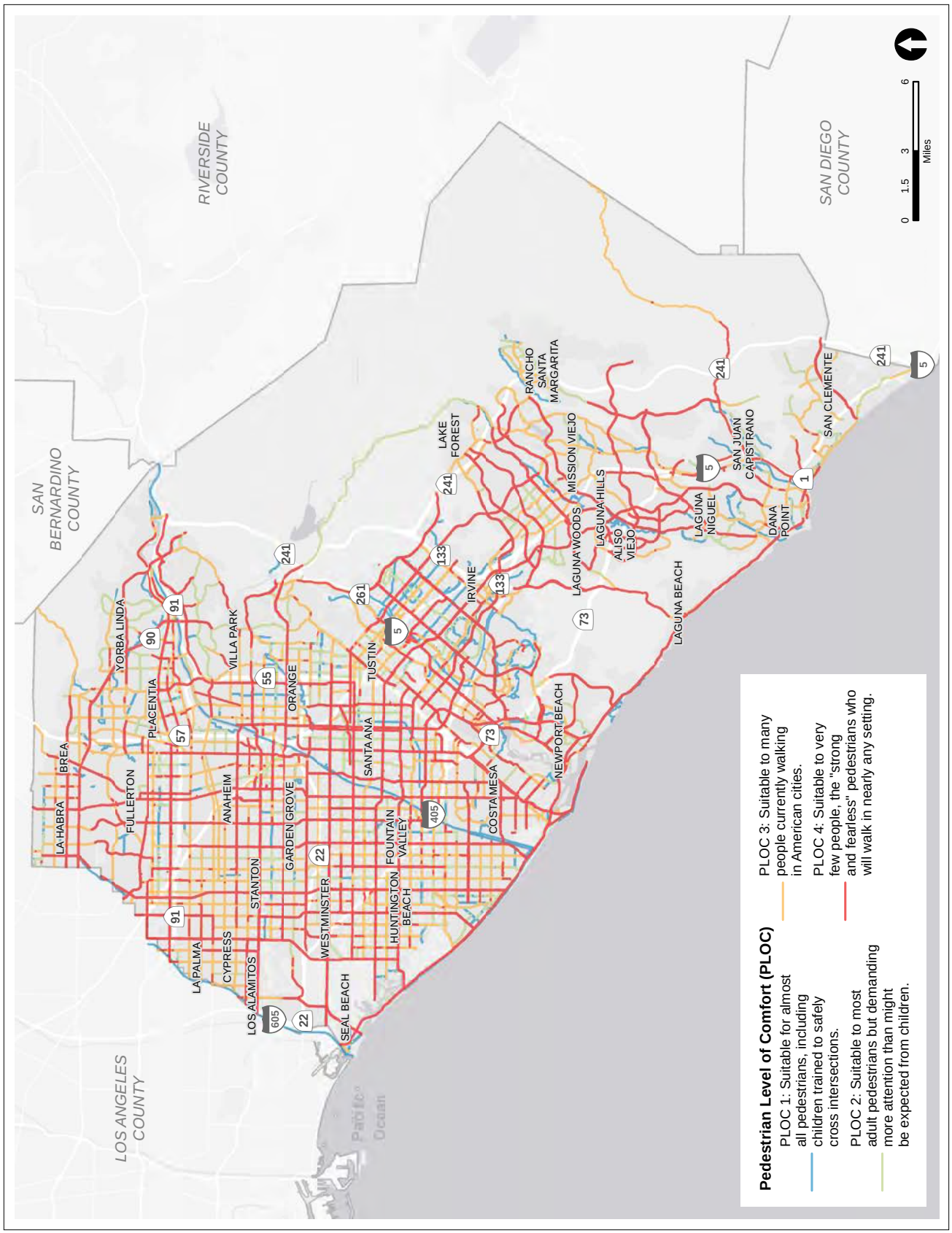


Figure 2.1 – Pedestrian Level of Comfort

2.2 Bikeways

Existing bikeway and road infrastructure contributes to the ability of residents to bike to their destination. This section discusses existing bikeway inventory as well as the bicycle level of traffic stress (BLTS) that a typical bicyclist would experience along specific corridors throughout Orange County.

2.2.1 Existing Bikeway Inventory

As described in the Caltrans Highway Design Manual (HDM), bikeways are categorized into four classes:

Class I (Bike Path) – provides a completely separate right of way for the exclusive use of bicycle and pedestrians with cross-flow minimized. The state design standard recommends a minimum 8 foot wide paved path between the edge of pavement of the path and the edge of traveled way of a parallel road, plus a 2 foot wide shoulder.

Class II (Bike Lane) – provides a striped lane for one-way bike travel on a street or highway. The HDM Mandatory Standard requires a minimum width of 4 feet, 5 feet when adjacent on-street parking, and 6 feet when posted speeds are greater than 40 miles per hour.

Class III (Bike Route) – a signed, shared roadway that provides for shared use with pedestrians or motor vehicle traffic, typically on lower volume roadways. A bike route has signs posted identifying it as a bike route and may have shared lane markings (sharrows).

Class IV (Separated Bikeway) – bikeway for the exclusive use of bicycles, requiring a separation between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

As of December 2015, there are approximately 262 miles of existing Class I bikeways, 760 miles of Class II bikeways, and 101 miles of Class III bikeways throughout Orange County. In other words, the majority of bikeways in Orange County (861 miles out of 1,123 miles) are classified as Class II or III bikeways, that bicyclists share a road with vehicles with no physical barrier in between. Recently, separated bikeways have been constructed in San Clemente and Santa Ana.

Figure 2.3 displays the existing bikeways against the existing arterial roads that are classified as either Principal, Major, Primary, Secondary, or Collector roads by the OCTA Master Plan of Arterial Highways (MPAH). The longest Class I Multi-Use Paths can be found in the Irvine area, along the Santa Ana River, along the northern border of the County, and near coastal areas in the southern portion of the County. The majority of MPAH arterials in the southern portion of the County include some type of bikeway, while a disproportionately large number of MPAH arterials in the northern portion of the County are missing bikeways, especially in cities that immediately surround Interstate 5.

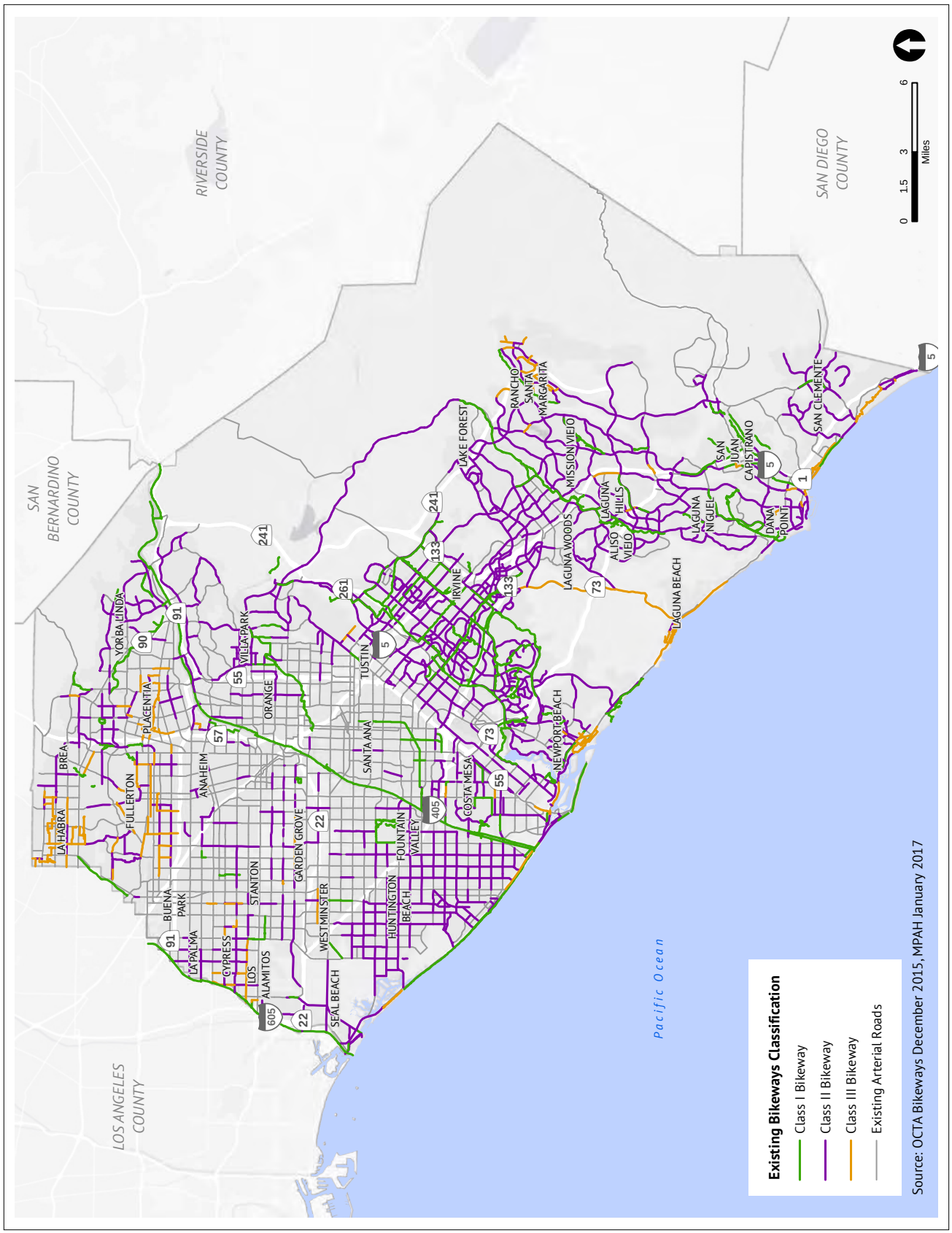


Figure 2.2 – Existing Bikeway Inventory

2.2.2 Bicycle Level of Traffic Stress

The ability of a bicyclist to navigate through corridors safely and comfortably depends on a variety of factors. These factors together determine the level of traffic stress that the bicyclist may experience along a certain corridor. Lower levels of traffic stress mean that the corridor is suitable for most cyclists, including children, while higher levels of traffic stress (LTS) signify a corridor that is only suitable for the few more experienced cyclists who will ride in almost any setting.

To measure existing levels of traffic stress throughout Orange County, the project team developed a scoring model for each MPAH roadway segment throughout the county. The 2012 Mineta study[1] was used for guidance in developing this model and was modified by the project team to incorporate average daily traffic (ADT) and roadway classification in place of speed. As with the bicycle stress analysis, the project team's use of speed data is desired but unavailable. Again, roadway classification was only used for a few segments that did not have recorded ADT values.

The factors considered in this analysis for each MPAH road included:

- Average Daily Traffic (ADT)
- Existing bikeways and their respective facility class
- Road classification
- Number of lanes

The resulting segment scores ranged from LTS 1 (lowest level of traffic stress) to LTS 4 (highest level of traffic stress). The scoring system used to classify each segment is found in Tables A.5 through A.6 in the Appendix. Values were assigned to each condition based on original guidance from the Mineta study, and augmented by the project team's knowledge of stressful cycling conditions based on field observations and industry experience. Note that all Multi-use Pathways, or Class I facilities, are automatically scored as LTS 1. The results were intended to identify high-stress areas that could benefit from improvements to the bicycle network as well as to highlight low stress pathways that could be developed into alternative routes.

An overwhelmingly large portion of roads in the northern portion of the County have the highest levels of traffic stress, mostly consistent with areas that were shown to be missing bikeway infrastructure in Figure 10. Coast Highway is also almost entirely classified as LTS 4, as are many high traffic volume arterials. Results also highlight many areas that score in the LTS 1-2 range that could be developed as alternative routes given minor improvements and intersection treatments. Results of the Level of Traffic Stress Analysis for Orange County are shown in Figure 2.4.

[1] *Mekrua, M.C., Furth. P.G., and Nixon, H. (2012). Low-Stress Bicycling and Network Connectivity. San Jose, CA: Mineta Transportation Institute.*

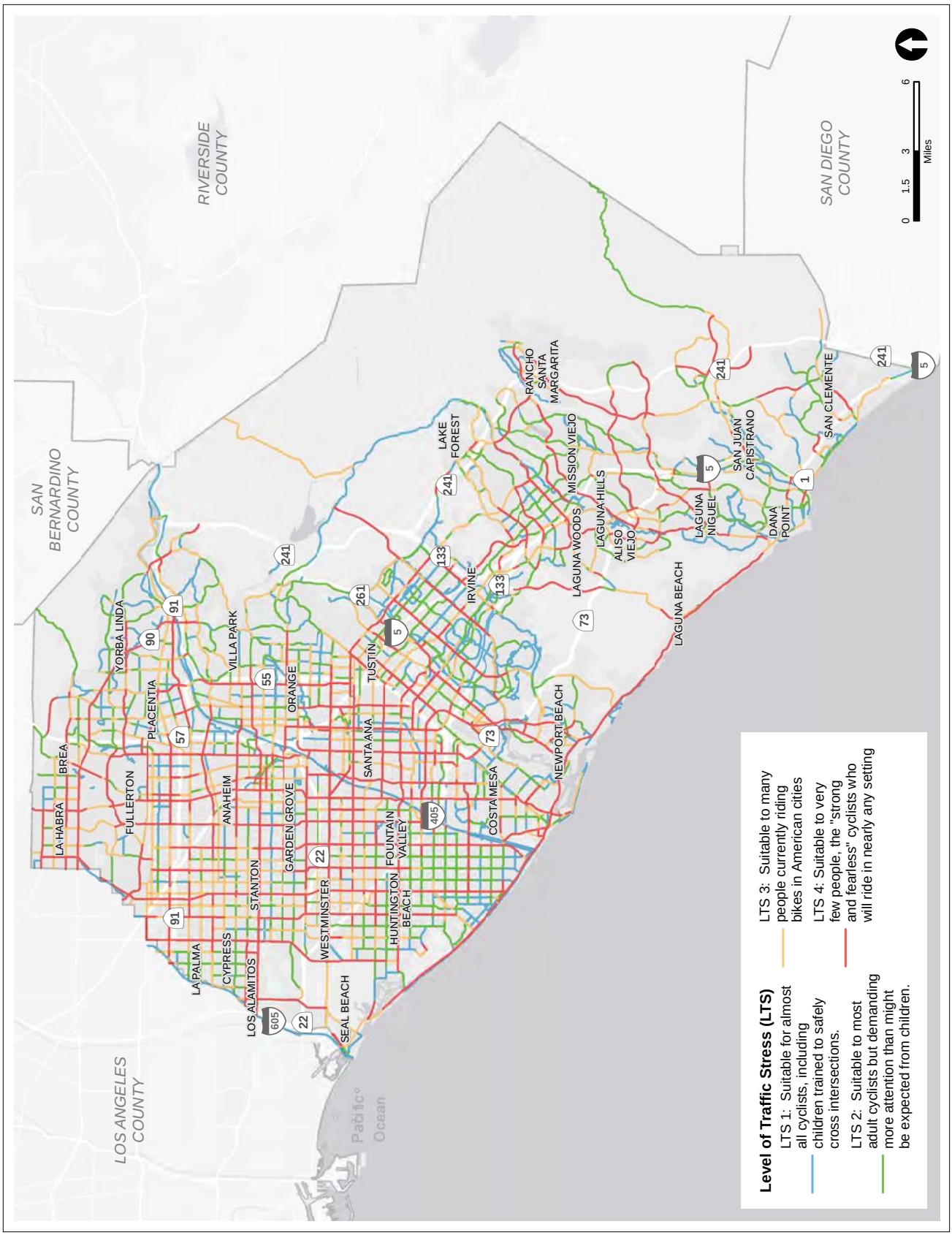


Figure 2.3 – Bike Level of Traffic Stress

2.3 End of Trip Facilities

Bike racks, bike lockers, showers, and other end-of-trip facilities are an important element in the development of a robust active transportation network, and in encouraging people to utilize active transportation modes for more trips. Guidelines and regulations for the implementation of end of trip facilities do vary on a city-by-city basis within Orange County. Table 2.13 summarizes existing end-of-trip facilities at major destinations for each city in Orange County, and discusses existing regulations and guidelines established by each city related to the provision of end-of-trip facilities for private development.

Table 2.13 – Existing End of Trip Facilities by City

City	End-of-Trip Facilities	
	Location	Type
Aliso Viejo	City municipal code requires A) uses required to provide bicycle parking equal to three percent of the total required automobile parking spaces include: video and game arcades, bowling alleys, cinemas/movie theaters, commercial recreation, health clubs, libraries, schools, and skating rinks. B) uses required to provide at least five bicycle parking spaces include: banks, churches, clubs/halls, hospitals, restaurants (all categories). C) uses required to provide bicycle parking equal to one space for each 25,000 square feet of gross floor area include all office uses. D) shopping centers shall provide five bicycle parking spaces for each major tenant having over 20,000 square feet of gross floor area. The spaces shall be provided at or near the tenant's main entry.	
Anaheim	200 S. Anaheim Blvd. 201 Anaheim Blvd. 235 E. Center St. Anaheim Canyon Metrolink Station ARTIC Angel Stadium of Anaheim	Bicycle lockers Bicycle lockers and showers Bicycle lockers Bicycle lockers Bicycle lockers Bicycle lockers
	Bicycle parking is commonly located at schools, commercial centers, parks, libraries, shopping centers, government buildings, office parks, tourist destinations, and multi-family housing. Complete inventory is not available but bicycle parking is a mitigation measure for new development projects in the Platinum Triangle and the Anaheim Resort, and is required for new non-residential developments and schools subject to the Green Building Standards Code (CALGreen Code). A comprehensive municipal code amendment to allow developers to provide bicycle parking in lieu of vehicle parking was being considered in March 2017.	
Brea	Brea Mall Various locations in Downtown Brea The Tracks at Brea	Bicycle racks Bicycle racks Bicycle racks
Buena Park	N/A	N/A
Costa Mesa	City municipal code (industrial/warehouse) requires that A) the number of bicycle facilities/ racks shall be provided at the rate of at least 1 rack per 20 employees and B) a minimum of 2 showers, one for female and one for male employees.	
Cypress	City municipal code requires that A) the number of facilities/racks to be provided at the rate of at least 5 racks for every 100 employees or fraction thereof and B) shower/locker room facility for employees of each sex shall be provided in each building housing 250 or more employees.	

City	End-of-Trip Facilities	
	Location	Type
Dana Point	City code allows development projects with a minimum parking requirement of fifty or more parking stalls to install bicycle stalls for up to 8% of the required stalls. Code also requires mixed-use projects to provide storage and a bicycle locker for each residential unit.	
Fountain Valley	City municipal code requires that a shower/locker room facility for employees of each sex shall be provided in buildings of 100,000 or more gross sqft & each single-room occupancy project shall provide a secured bicycle parking area to accommodate 1 bicycle for every 3 units.	
Fullerton	CSUF (30 locations) City Hall Richman Park Fullerton Transit Center/Bike & Ride SOCO District parking structure Fullerton Park & Ride/Bike & Ride Private dev 100,000 gross sq. ft.	Bicycle racks (650 bikes) Bicycle racks and lockers Bicycle racks Bicycle racks and lockers Bicycle racks Bicycle racks and lockers (End of trip facilities required)
Garden Grove	City Hall	Bicycle racks (8)
	City municipal code requires that secure, and convenient bicycle parking shall be provided at a rate of one bicycle space for every 10 required parking spaces for all new developments where parking is not provided in the form of individual garages. The City also uses the 2016 California Green Building Standards Section 5.106.4 - Bicycle Parking.	
Huntington Beach	City municipal code: **Parking requirements** - Nonresidential: A) 1 bicycle space for every 25 automobile parking spaces (minimum of three) for buildings up to 50,000 sqft of gross building area or B) the director shall determine the number of bicycle spaces based upon the type of use(s) and number of employees for buildings over 50,000 sqft of gross building area. **Site development standards (TDM)** - Shower/locker facilities: A) lockers shall be provided at a minimum ratio of 1 for every 20 employees and B) separate shower facilities shall be provided at a minimum rate of 2 per 100 employees. Bicycle parking: A) bicycle parking shall be provided at a minimum rate of 1 bicycle space for every 20 employees of fraction thereof and B) a bicycle parking facility shall be a staionary object to which the user can lock the bicycle frame and both wheels.. **Project requirements (Single-room occupancy)** - - bicycle stalls shall be provided at a minimum of 1 stall per 5 units.	
Irvine	Irvine Station	Bicycle lockers for a monthly fee (54)
	Found throughout Irvine as a result of zoning ordinance Sec. 4-3-7, requiring bicycle parking for many commercial, office, and community developments.	
La Habra	Municipal code Chapter 18.20.050 Facility Standards: A. Option “A” Facility Improvements. 2. Bicycle Parking and Shower Facilities a. Bicycle parking and locker facilities shall be provided in a secure location for use by employees or tenants who commute to the work site by bicycle. The number of facilities/racks to be provided shall be at the rate of at least five racks for every one hundred employees or fraction thereof. b. A minimum of two shower facilities shall be provided, one each for men and women.	

City	End-of-Trip Facilities	
	Location	Type
La Palma	Some developments required to provide bicycle parking and shower and lockers due to TDM requirements.	
Laguna Beach	City municipal code requires A) the number of facilities/racks to be provided shall be at the rate of at least 5 racks for every 100 employees or fraction thereof and B) a minimum of 2 shower facilities shall be provided, one each for men and women.	
Laguna Hills	The City has adopted the 2016 California Green Building Standards Code. Section 5.106.4.1 calls for bicycle parking and related facilities.	
Laguna Niguel	City municipal code requires A) uses required to provide bicycle parking equal to three percent of the total required automobile parking spaces include: video and game arcades, bowling alleys, cinemas/movie theaters, commercial recreation, health clubs, libraries, schools, and skating rinks. B) uses required to provide at least five bicycle parking spaces include: banks, churches, clubs/halls, hospitals, restaurants (all categories). C) uses required to provide bicycle parking equal to one space for each 25,000 square feet of gross floor area include all office uses. D) shopping centers shall provide five bicycle parking spaces for each major tenant having over 20,000 square feet of gross floor area. The spaces shall be provided at or near the tenant's main entry.	
Laguna Woods	City municipal code requires for TDM that A) bicycle parking facilities shall be provided within the worksite at the minumum rate of 1 bicycle space for every 25 employees, maximum number of bicycle spaces is 50 and B) a bicycle parking facility shall be a stationary object to which the user can lock the bicycle frame and both wheels.	
Lake Forest	Short and long-term bicycle parking per CA Green Building Code; City municipal code: For uses estimated to employ 250 or more persons and subject to a discretionary permit: **Site development standards** - Bicycle parking: A) bicycle parking facilities shall be provided within the worksite at the minimum rate of 1 bicycle parking space for every 20 employees and B) a bicycle parking facility shall be a stationary object to which the user can lock the bicycle frame and both wheels. Shower facilities: the design of such facilities shall be shown on the plot plans in the permit application and shall be provided at a minimum rate of 2 shower facilities, 1 each for men and women. Locker facilities: lockers shall be provided at a minimum ratio of 1 for every 20 employees.	
Los Alamitos	For facilities developed as part of the City's Transportation Demand Management requirements, City municipal code identifies potential facility improvement options, which may include the following: A) the number of facilities/racks to be provided shall be at the rate of at least 5 racks for every 100 employees or fraction thereof and B) a minimum of 2 shower facilities shall be provided, 1 each for men and women.	

City	End-of-Trip Facilities	
	Location	Type
Mission Viejo	City Hall (200 Civic Center) Library (100 Civic Center) Norman P Murray Community Center (2432 Veteran's Way) Sierra Recreation Center (26887 Recodo Ln) Felipe Tennis Center (27161 Nogal)	1 bike rack (fits up to two bikes) 2 bike racks (fits up to four bikes) 1 bike rack (fits up to two bikes) 1 bike rack (fits up to three bikes) 1 bike rack (fits up to two bikes)
	City municipal code: **Zoning district development standards** - Mini markets: The retail sales of groceries, staples, sundry items and/or alcoholic beverages within structures of less than 5,000 square feet of gross floor area shall be constructured and operated in the following manner: A bicycle rack designed to accommodate a minimum of 6 bicycles shall be installed in a convenient location, visible from the inside of the store. **Transportation Management Programs** (Section 9.24.025) - (b) Bicycle parking. A bicycle parking/storage area shall be provided for use by employees and tenants, located in a secure location in close proximity to public entrances. (g) Miscellaneous optional requirements: (2) Shower and locker facilities provided on-site for use by employees or tenants who commute to the site by riding a bicycle or walking. 2016 California Green Building Standards Code: Buildings within the authority of California Building Standards Commission are subject to Section 5.106.4.2 regarding bicycle parking.	
Newport Beach	City municipal code: **Bicycle parking for nonresidential developments** - The bicycle parking standards of this section shall be required for new nonresidential developments with gross floor areas of 10,000 sqft or more. Nonresidential developments that are less than 10,000 sqft shall be encouraged to provide such facilities, when feasible. A) 5 percent of the number of off-street parking spaces required. **Site development requirements (TDM)** - Bicycle lockers or bicycle racks, as determined by the review authority, shall be provided for use by employees or tenants. A minimum of 2 lockers per 100 employees shall be provided. Lockers may be located in a required parking space.	
Orange	Eisenhower Park El Camino Real Park Fred Barrera Park Grijalva Park Hart Park Killerfer Park McPherson Park Olive Park Pitcher Park Santiago Hills Park Serrano Park Shaffer Park The Depot Park Veterans Memorial	Bicycle racks (1) Bicycle racks (5) Bicycle racks (1) Bicycle racks (1) Bicycle racks (4) Bicycle racks (1) Bicycle racks (6) Bicycle racks (1) Bicycle racks (1) Bicycle racks (3) Bicycle racks (1) Bicycle racks (1) Bicycle racks Bicycle racks

City	End-of-Trip Facilities	
	Location	Type
Placentia	City municipal code: **Parking standards** - Short term: A) Residential: 1 resident bicycle parking space for every 5 residential units, or portion thereof. B) Nonresidential: 1 bicycle parking space for every 5,000 sqft, or portion thereof, of nonresidential floor area. Long term: A) Residential: 2 bicycle storage units for every 5 dwelling units for the first 20 units, and 1 for every 5 additional units, or portion thereof. B) Nonresidential: any establishment with a parking structure and a minimum of 10,000 sqft of nonresidential space shall provide long-term bicycle parking at a minimum ratio of 1 space per 20 vehicle spaces.	
Rancho Santa Margarita	Various bus shelter locations	Bicycle racks
San Clemente	Ole Hanson Beach Club La Pata/Vista Hermosa Park Municipal Parks	Bicycle racks and showers Bicycle racks, showers, and lockers Bicycle racks
San Juan Capistrano	City municipal code requires bicycle storage facilities shall be provided for 5 bicycles for every 100 employees or fraction thereof. Shower facilities shall be provided at a minimum of 2 for every 250 employees or fraction thereof.	
Santa Ana	Civic Center	Bicycle racks
Seal Beach	City municipal code: **Required bicycle parking** - A) bicycle parking shall be provided for all new construction, additions of 10% or more floor area to existing buildings, and changes in land use classification as set forth in subsections B and C. B) nonresidential developments shall provide one bicycle stall for every 20 parking spaces. C) residential multiple-unit developments shall provide at a minimum one bicycle stall per 4 units in a secured. **Development standards** - An applicant shall provide showers and locker rooms for employees of each sex in each building with a floor area of 100,000 or more sqft. The decision-maker may require an applicant to provide such facilities in any development with a total floor area of 100,000 or more sqft, even though no single building has a floor area of 100,000 or more sqft.	
Stanton	5 bicycle parking locations required per 100 employees, and minimum of two shower facilities for new developments under TDM Facility Standards.	
Tustin	City municipal code requires parking for 5 bicycles for every 100 employees or fraction thereof. Shower/locker facilities for employees of each sex shall be provided in each building of one hundred thousand (100,000) or more gross square feet. For any development containing 100,000 or more total combined gross sqft, but which does not contain any single building of 100,000 or more gross sqft, the City Planning Commission may elect, at its discretion, to approve a requirement imposed by City staff on such development to provide shower and locker room facilities.	
Villa Park	N/A	

City	End-of-Trip Facilities	
	Location	Type
Westminster	City municipal code: **Bicycle parking** - A) multifamily projects shall provide bicycle parking spaces equal to a minimum of 10 percent of the required vehicle spaces, unless a separate secured garage space is provided for each unit. The bicycle spaces shall be distributed throughout the project to the extent feasible. B) retail commercial uses shall provide bicycle parking spaces equal to a minimum of 5 percent of the required vehicle spaces. C) other nonresidential uses providing employment shall provide bicycle parking spaces equal to a minimum of 5 percent of the required vehicle spaces. D) where the provisions of this Section conflict with the provisions of Section 17.400.165, Transportation Demand Management, the provision requiring the greater number of bicycle parking facilities shall prevail. **TDM** - A) the number of facilities/racks to be provided shall be at the rate of at least 5 racks and lockers for every 100 employees or fraction thereof. B) a shower and locker-room facility for employees of each sex shall be provided in each building of 100,000 or more gross sqft. For any development containing 100,000 or more total combined gross sqft, but which does not contain any single building of 100,000 or more gross sqft, the Director or Commission may require such development to provide shower and locker room facilities in a convenient and accessible location for use by employees of all tenants.	
Yorba Linda	The Bikeway Trails Component identifies provision of comprehensive bicycle parking at destinations and inter-modal locations as a key security recommendation.	
Orange County	In development reviews, the County typically conditions developers to provide bicycle amenities and end-of-trip facilities based on the County of Orange Transportation & Recreation Elements within the General Plan. County's regional and wilderness parks typically provide bicycle parking.	

2.4 Wayfinding

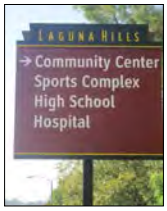
Wayfinding infrastructure can positively contribute to the utilization and enjoyment of active transportation facilities by providing information to users regarding destinations served by the facility, distance, and time for travel to destinations. Table 2.14 present a summary of active transportation wayfinding that exists in each city within Orange County.

Table 2.14 – Existing Wayfinding by City

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Aliso Viejo	12 named bike trails and parks, floor signage City provides local destination wayfinding signage for all travel modes	No planned additions at this time	 

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Anaheim	9 bike trails listed on City's site. Wayfinding typically consists of signage as allowed by the FHA's Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).	The City's 2016 Bicycle Master Plan recommends implementation of a bicycle wayfinding program	
Brea	Downtown Brea includes wayfinding signage for major destinations for all travel modes	No planned additions at this time	 
Buena Park	The City has installed visitor-oriented wayfinding signage in the Entertainment District. This wayfinding signage is focused on key destinations and is for all modes	No planned additions at this time	
Costa Mesa	No wayfinding signage is currently provided	City has new general wayfinding signage standards planned as of 2018	
Cypress	No wayfinding signage is currently provided	No planned additions at this time	
Dana Point	The City has installed general visitor-oriented wayfinding signage near City Hall and Dana Point Harbor for all modes	No planned additions at this time	

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Fountain Valley	No wayfinding signage is currently provided	No planned additions at this time	
Fullerton	Trail signage, 11 trails listed on City of Fullerton website	City is currently collecting an inventory of wayfinding signage	
Garden Grove	Bike route signage and wayfinding signs provided for Civic Center, Main Street, theater, shopping centers	No planned additions at this time	  
Huntington Beach	Bike route and coastal access signs provided by the beach	The City's Bicycle Master Plan includes additional recommendations for wayfinding signage	 
Irvine	21 named bike trails Wayfinding signage is provided at major entrances to off-street bicycle and multi-use trails	One additional trail to be named	 
La Habra	2 bikeways & 4 bike paths listed on the City website	The City's Bicycle Master Plan includes additional recommendations for wayfinding signage	 
La Palma	No wayfinding signage is currently provided	No planned additions at this time	

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Laguna Beach	No wayfinding signage is currently provided	No planned additions at this time	
Laguna Hills	Wayfinding is provided for points of interest such as the community center, city hall, hospital, high school. This signage is for all modes.	N/A	
Laguna Niguel	No wayfinding signage is currently provided	No planned additions at this time	 
Laguna Woods	No wayfinding signage is currently provided	No planned additions at this time	
Lake Forest	Wayfinding is provided for points of interest. This signage is for all modes.	No planned additions at this time	 
Los Alamitos	No wayfinding signage is currently provided	No planned additions at this time	 

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Mission Viejo	5 bike trails and 1 Class II trail listed on city's website	Final design plans to construct 32 new wayfinding signs in the City completed.	
Newport Beach	Trail wayfinding signs, route signs near the beach	The City's Bicycle Master Plan includes recommendations for wayfinding signage	  
Orange	No wayfinding signage is currently provided	No planned additions at this time	
Placentia	N/A	City plans to solicit proposals for a comprehensive wayfinding program.	N/A
Rancho Santa Margarita	No wayfinding signage is currently provided	No planned additions at this time	N/A
San Clemente	City has installed general visitor wayfinding signage in downtown. This signage is for all modes.	City has plans to install Pacific Coast Bicycle Route wayfinding signage. The City's Bicycle Master Plan also includes recommendations for wayfinding signage.--	

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
San Juan Capistrano	City has installed general visitor wayfinding signage in downtown. This signage is for all modes.	No planned additions at this time	
Santa Ana	The City has installed Downtown Santa Ana district wayfinding. This signage is for all modes	No planned additions at this time	
Seal Beach	No wayfinding signage is currently provided	No planned additions at this time	
Stanton	No wayfinding signage is currently provided	No planned additions at this time	
Tustin	No wayfinding signage is currently provided	No planned additions at this time	
Villa Park	No wayfinding signage is currently provided	No planned additions at this time	

City	Wayfinding		Photo(s) (if applicable)
	Existing	Planned	
Westminster	No wayfinding signage is currently provided	No planned additions at this time	
Yorba Linda	No wayfinding signage is currently provided	No planned additions at this time	
Orange County	No wayfinding signage is currently provided, except for unpaved trails	No planned additions at this time	

2.5 Mode Share/Walking and Biking Trends

Residents' choice in travel mode can be a reflection of the region's infrastructure and connectivity as seen in the previous sections, as well as cultural attitudes toward automobile use. According to the 2016 American Community Survey, the majority of commuters of employment age (16 years and older) in Orange County utilize a car to get to work, with about 78.5% of residents driving alone (Table 2.15). In comparison, 73.5% of residents across California drive alone to work. Additionally, only 1.9% of Orange County residents walk to work, compared with 2.7% of residents across the state.

Table 2.15 – Travel Mode Choice to Work in Orange County and California by Percentage of Residents (Source: 2012-2016 American Community Survey 5-Year Estimates).

Travel Mode to Work	Orange County	California
Car - Drive Alone	78.5%	73.5%
Car - Carpool	9.7%	10.6%
Public Transit	2.4%	5.2%
Walk	1.9%	2.7%
Bicycle	0.9%	1.1%
Other	6.6%	6.8%

Orange County tends to vary widely in terms of land use diversity. Employment centers are often centrally located away from residential areas, often encouraging workers to travel by car out of convenience. Public transit is not a widely used alternative in Orange County as compared to California as a whole, and walking is also not a common travel mode. The percentages of commuters traveling to work by bicycle are low in both Orange County and California overall.

2.6 Land Use/Major Destinations

An important part of understanding the existing conditions of bicycle and pedestrian networks is accounting for land use context and major county destinations. Land use can affect the development of active transportation infrastructure, as well as inform decision-makers of the areas and destinations in the county where a bicyclist or pedestrian may be most likely to travel.

2.6.1 Major Destinations in Orange County

Major destinations in Orange County consist of popular shopping centers, industrial areas, business areas, and recreational areas such as Disneyland, the Irvine Spectrum and South Coast Metro. Figure 3.5 illustrates the location of these activity centers and major destinations throughout the county, as well as their location in relation to the county's major transit hubs, which include Metrolink commuter rail stations and major transit centers with connections to bus facilities. While most of the major destination areas have access to some sort of major transit connection, it seems that there are missing links to some of the major destinations in the northern and northwestern parts of the county.

2.6.2 Land Use Designations in Orange County

Each of the 34 cities in Orange County, as well as unincorporated area under the jurisdiction of the County of Orange, establishes its own land use designations and zoning. Maps depicting land use designations for each city are provided in the Appendix.

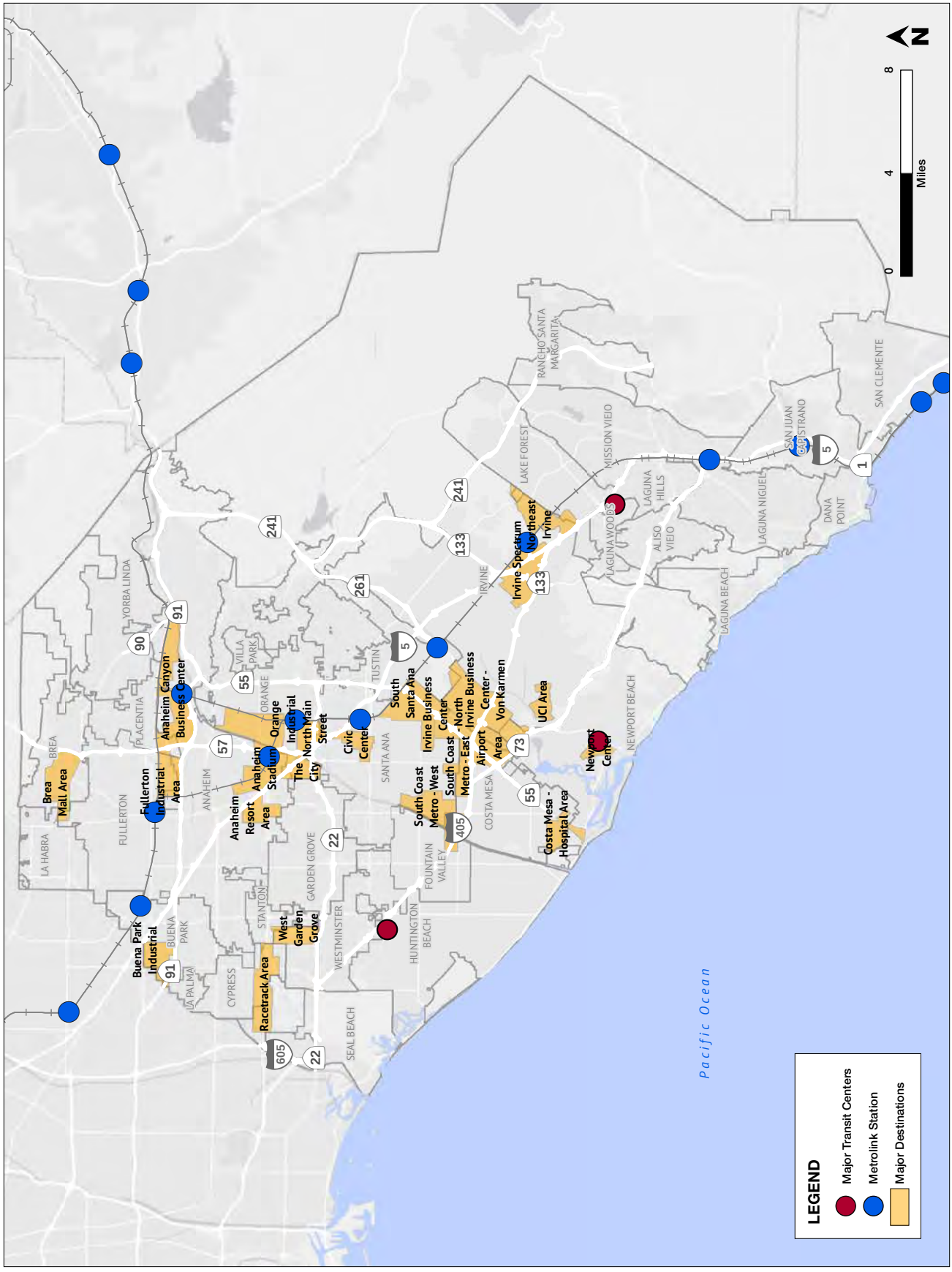


Figure 2.4 – Major Destinations in Orange County

2.7 Collision Analysis

2.7.1 Bicycle and Pedestrian Collisions

A sense of safety is a significant factor in mode choice. Bicycle and pedestrian collision data can assist in indicating the level of safety provided by the current infrastructure. Bicycle and pedestrian collision data is sourced from the California Statewide Integrated Traffic Records System (SWITRS).

The total number of bicycle collisions in Orange County between the years 2009-2013 was 6,501, with almost 1% being fatal and nearly 6% resulting in a serious injury. The total number of pedestrian collisions in the same time period was slightly less than the number of bicycle collisions, with 4,209 pedestrian collisions occurring throughout the county. However, 5% of these collisions were fatal, and 13% resulted in a severe injury, higher than the instances of bicycle collisions with those levels of severity.

Table 2.16 – Orange County Bicycle and Pedestrian Collision Summary (2009-2013)

Collision Severity	Bicycle Collisions		Pedestrian Collisions	
	Count	%	Count	%
Fatal	50	0.8%	210	5.0%
Injury (Severe)	369	5.7%	553	13.1%
Injury (Other Visible)	3535	54.4%	1860	44.2%
Injury (Complaint of Pain)	2547	39.2%	1586	37.7%
Total Collisions	**6501**	**100%**	**4209**	**100%**

Figure 2.6 shows the location of bicycle collisions in the region over a 5-year period. A high number of collisions are often located in areas with little to no bicycle infrastructure and high levels of traffic stress, such as in Santa Ana, Orange, and Anaheim. In terms of pedestrian collisions, Figure 2.7 demonstrates a similar pattern of collision frequency and distribution with most collisions occurring in the northern portion of the county and along high vehicle traffic areas with limited active transportation-supporting infrastructure.

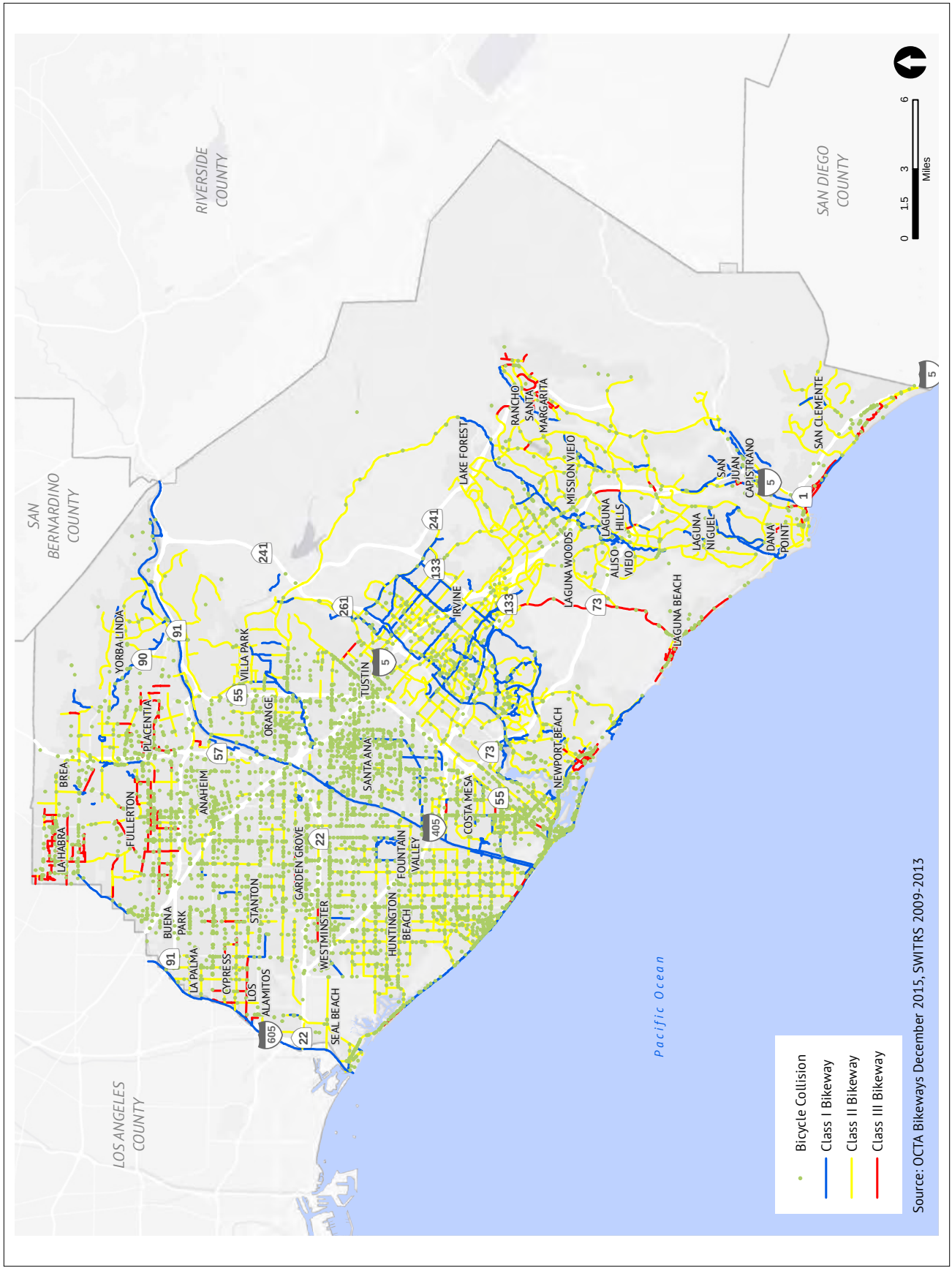


Figure 2.5 – Bicycle Collisions (2009-2013)

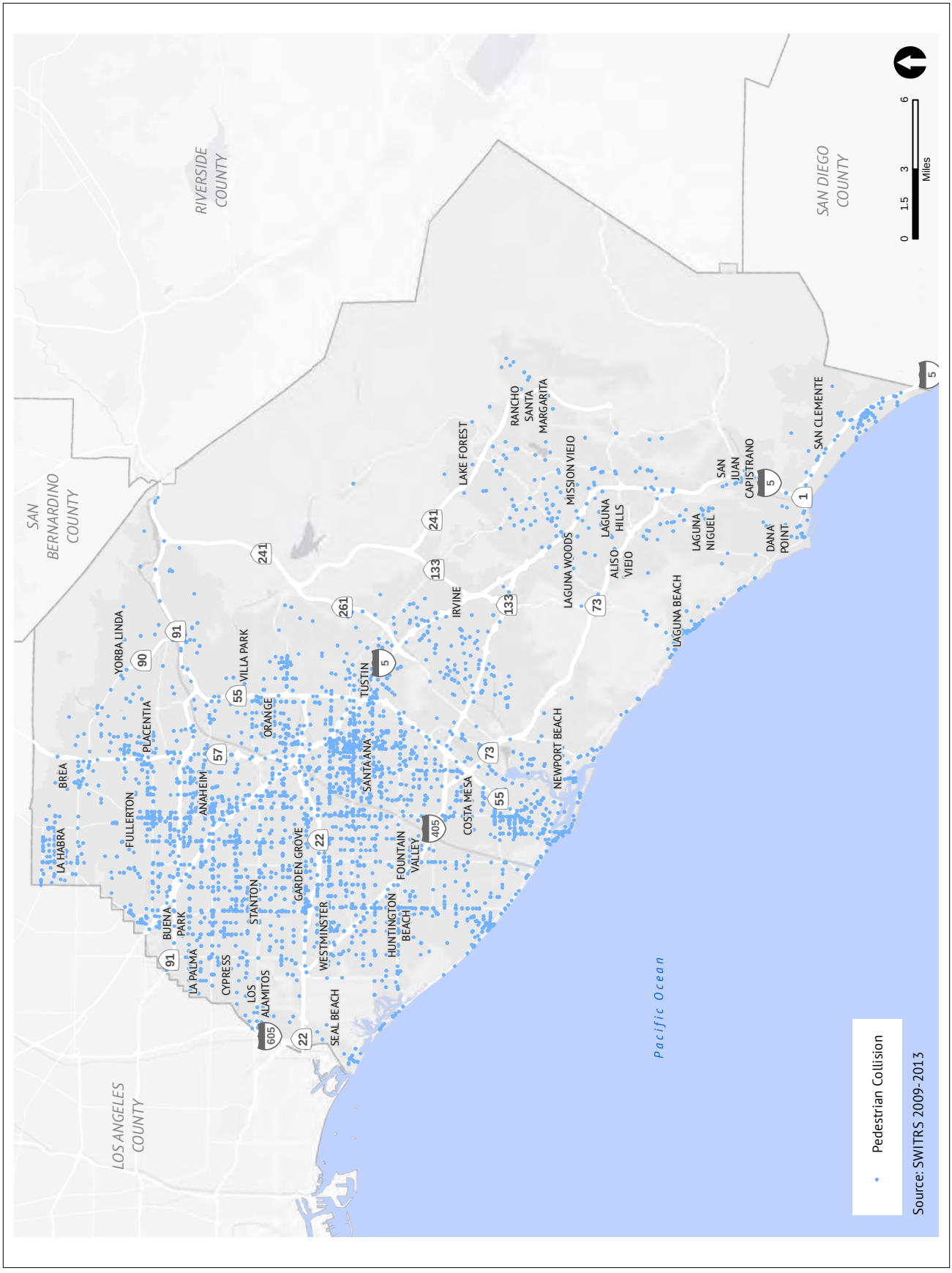


Figure 2.6 – Pedestrian Collisions (2009-2013)

This page intentionally left blank.

3 PEDESTRIAN NETWORK

Orange County's pedestrian network consists of sidewalks, multi-use trails, and pathways connecting residential neighborhoods with places of employment, transit, schools, parks, and other recreational facilities. Walking is an integral part of every trip regardless of mode, as a person is a pedestrian at some stage of every trip they choose to make. In light of this condition, it is important for the pedestrian network to be safe, convenient, and well-maintained in order to meet the travel needs of Orange County residents.

OC Active provides the first countywide analysis of pedestrian infrastructure and needs. Only a limited number of cities within the county have adopted active transportation plans that include both bicycle and pedestrian travel modes. Given this condition, OC Active placed an emphasis on conducting a countywide planning effort to identify the areas within the county that were in greatest need of improvements for those people walking or rolling on devices within the sidewalk or pedestrian realm.

A key element in the planning analysis was defining what "greatest need" means. It is beyond the scope of a countywide planning document to identify smaller, targeted pedestrian improvements, such as upgrades to curb ramps, fixing uneven sidewalks, or widening a narrow section of sidewalk that may not meet minimum width standards. Instead, the focus of the OC Active pedestrian analysis was placed on identifying the areas countywide and within each city that were in greatest need for pedestrian-related improvements.

The definition of "need" was explored in depth with the project advisory committee (SWG). Key themes of these discussions included identifying areas with crash history, areas categorized by the State as disadvantaged communities, areas that would be anticipated to attract high volumes of pedestrian traffic (including near schools, parks, and other recreational destinations), corridors with high traffic volumes and/or traffic speeds, routes that provide access to transit and employment, and locations with barriers to pedestrian travel (including missing sidewalks).

To properly quantify pedestrian areas of need throughout Orange County, the project team developed a pedestrian priority model that utilized a range of factors that influence the ability of people to get around by walking and the quality of the experience that these people would have. This section of OC Active provides an overview of the pedestrian focus model development process and the results of this modeling effort.

3.1 Pedestrian Focus Area Analysis

Orange County's existing pedestrian network is comprised of sidewalks, multi-use trails, pedestrian bridges, and other walking infrastructure designed to help people access key destinations including schools, employment centers, parks, and transit. The county is home to a diverse network of pedestrian conditions. Consequently, the amount of pedestrian activity and need varies substantially throughout the county. The OC Active pedestrian network analysis maps the highest need pedestrian focus areas countywide and provides a detailed map for each jurisdiction countywide. The focus areas were identified using a Geographic Information Systems (GIS) analysis. The GIS analysis incorporated multiple criteria including key destinations, community demographics, socioeconomic and health data, as well as potential barriers to pedestrian travel such as roadways with high traffic volumes, railroads, waterways, and freeways. Public input from the project survey was incorporated into the technical analysis, as well as OCTA-prepared mapping of sidewalk gaps along major roadways countywide.

3.1.1 Pedestrian Priority Model

There are many factors that can combine to create a situation where a street becomes an important pedestrian connection in a community. To help facilitate and automate the pedestrian analysis on a countywide scale, a GIS model was created using maps accounting for various factors. The Pedestrian Priority Model was developed to determine the most likely areas within each city where pedestrians are likely to be, either currently or if improvements were made. In addition, this model also factors in areas where each city can implement improvements to benefit the current or future pedestrian activity.

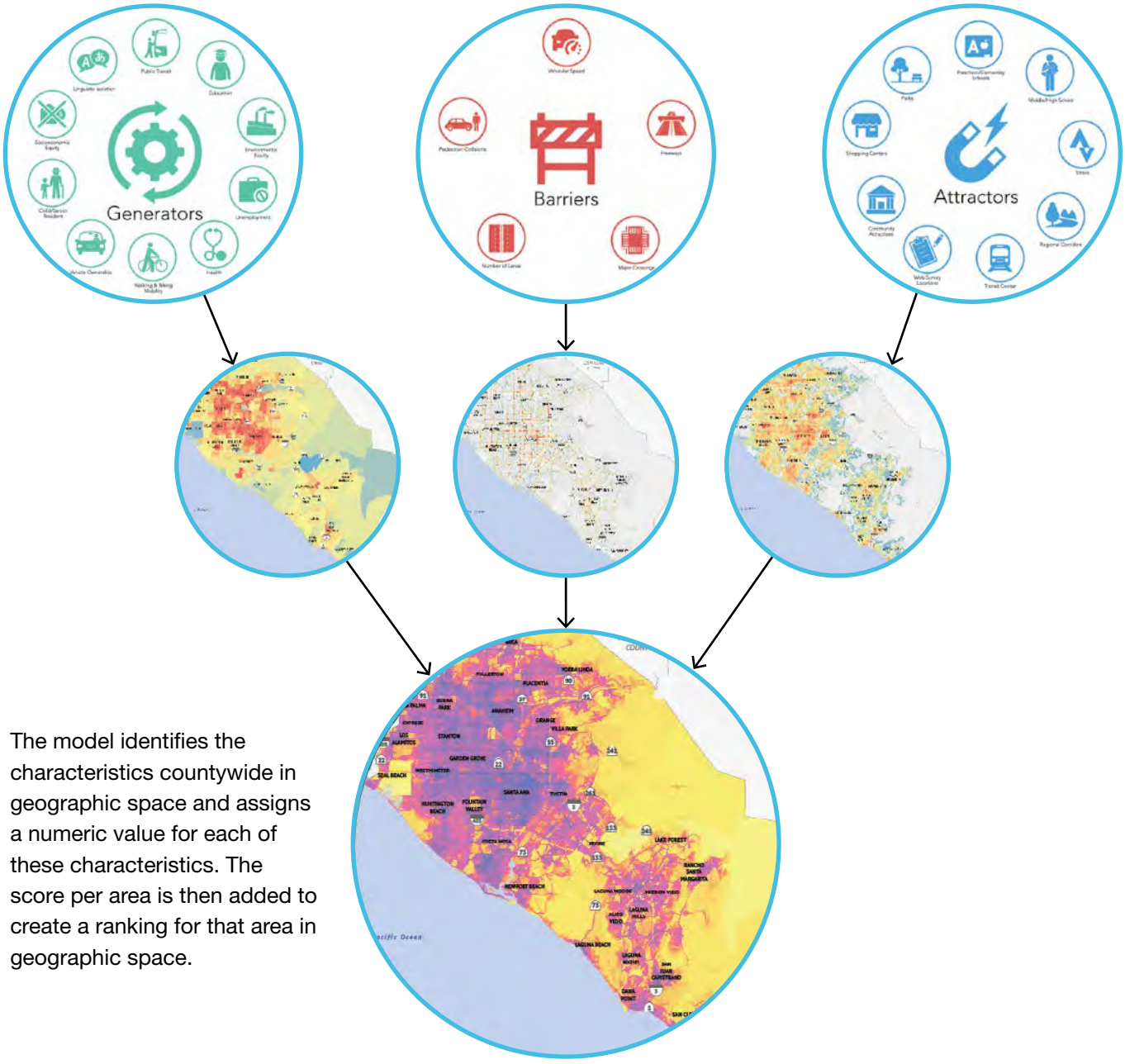
One of the primary purposes of this model is to assist cities and agencies with identifying and prioritizing areas for pedestrian improvements, and position to secure funding. Factors from the State of California Active Transportation Plan (ATP) grant program and OCTA's Bicycle Corridor Improvement Program (BCIP) were incorporated to help with future grant applications. Since disadvantaged communities are prioritized in the ATP program, data such as health (diabetes, community health, minority populations, etc.) was collected and incorporated into the model. The extensive project outreach conducted was also factored into the model where the number of comments from project locations were incorporated. The Pedestrian Priority Model identifies existing and potential pedestrian activity areas citywide utilizing existing data within an extensive GIS database.

The overall model is comprised of three basic models: Attractor, Generator and Barrier Models. When these three interim models are combined, they create the Pedestrian Priority Model.

Attractors: These are geographic features likely to attract pedestrians. Examples of these key destinations are schools, transit, community attractions, parks and shopping centers.

Generators: These are demographic, socioeconomic and health data indicating potential pedestrian volume based on how many people live and work in an area. Examples of generators are population and employment density and primary mode of transportation to work. Socioeconomic and health data examples include median household income, CalEnviroscreen, free or reduced meal programs, vehicle ownership and age density.

Barriers: These are features likely to discourage or detract people from walking. These are generally physical limitations such as areas with high numbers of pedestrian related collisions and pedestrian level of comfort.



The model identifies the characteristics countywide in geographic space and assigns a numeric value for each of these characteristics. The score per area is then added to create a ranking for that area in geographic space.

3.2 Pedestrian Focus Area Maps

Using the criteria and analysis based on the pedestrian priority model, a countywide map was generated and pedestrian focus area maps were produced for all 34 cities in Orange County, as well as the unincorporated areas under the jurisdiction of the County of Orange. The pedestrian focus area maps highlight the likely areas of greatest activity and demand for pedestrian travel.

Identification of an area as a pedestrian focus area does not necessarily mean that there is solely a need for infrastructure improvements. The pedestrian infrastructure may already be well developed and non-infrastructure efforts are applicable. In other cases, the focus maps may help cities to identify areas where infrastructure improvements would be effective to serve need.

The maps are a tool to prioritize implementation of infrastructure or non-infrastructure improvements and provide support for local funding assignment or pursuit of grant funding opportunities. Figure 3.1 illustrates the results of the pedestrian focus area mapping on a countywide basis. Individual jurisdiction pedestrian focus area maps are provided in the Appendix.

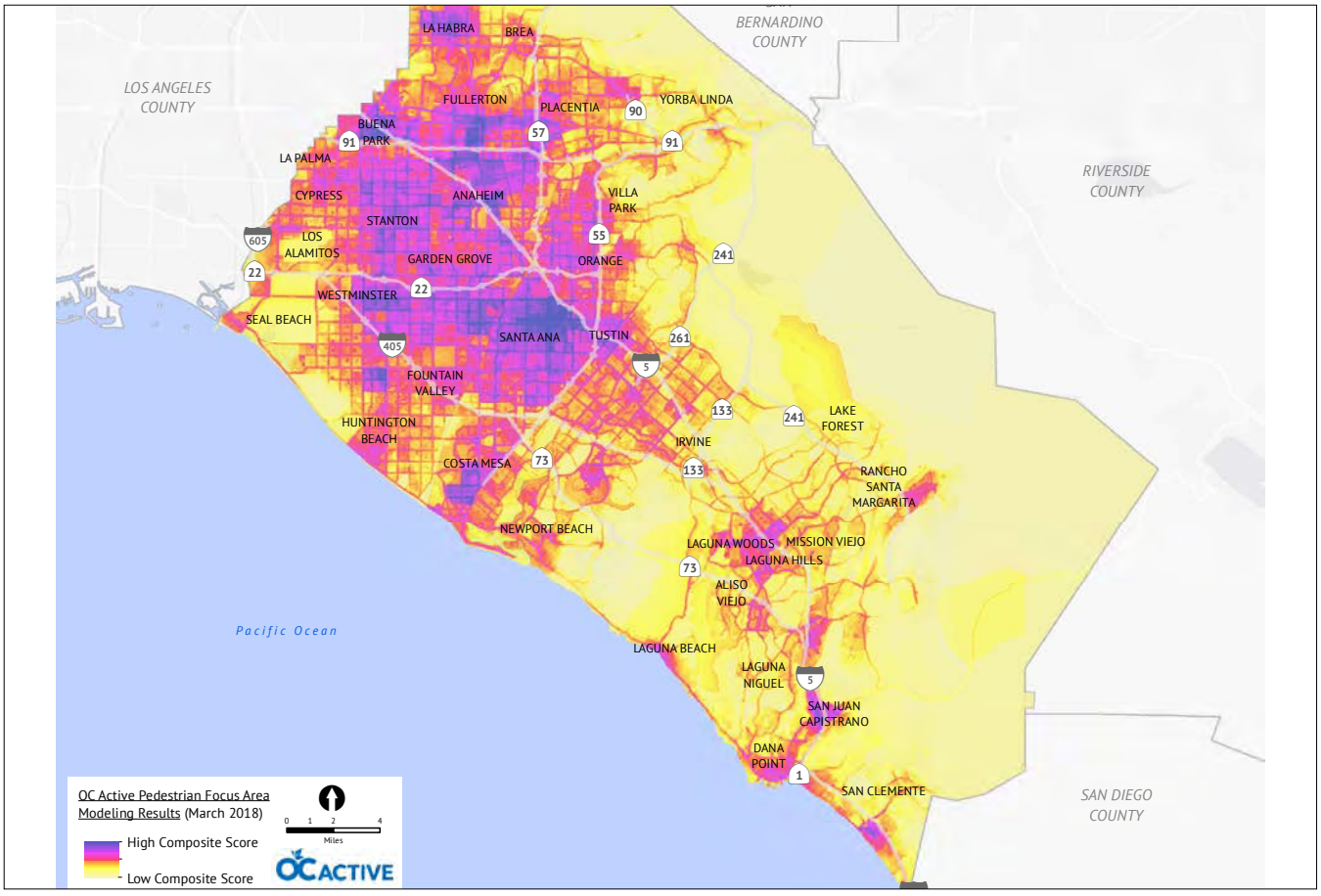


Figure 3.1 – Countywide Pedestrian Focus Area Map

3.3 Missing Sidewalk Analysis

Missing sidewalks are a key barrier to safe and convenient pedestrian travel. Conditions with missing sidewalks may cause pedestrians to make unsafe or inconvenient choices to reach their destination by traveling the adjacent roadway, crossing an adjacent roadway, or doubling back on their route to find a nearby continuous sidewalk segment across street or on a parallel route. Considering the significant impact of missing sidewalk segments on safe and convenient pedestrian travel, the project team utilized OCTA sidewalk inventory data on major roadways to identify street segments with missing sidewalks, either on one side or both sides of the street. Missing sidewalk maps were prepared for each local jurisdiction including the County of Orange. Figure 3.2 shows the countywide condition for sidewalks along arterial roadways. Individual jurisdiction missing sidewalk maps are provided in the Appendix and show where these sidewalks serve schools and transit hubs.

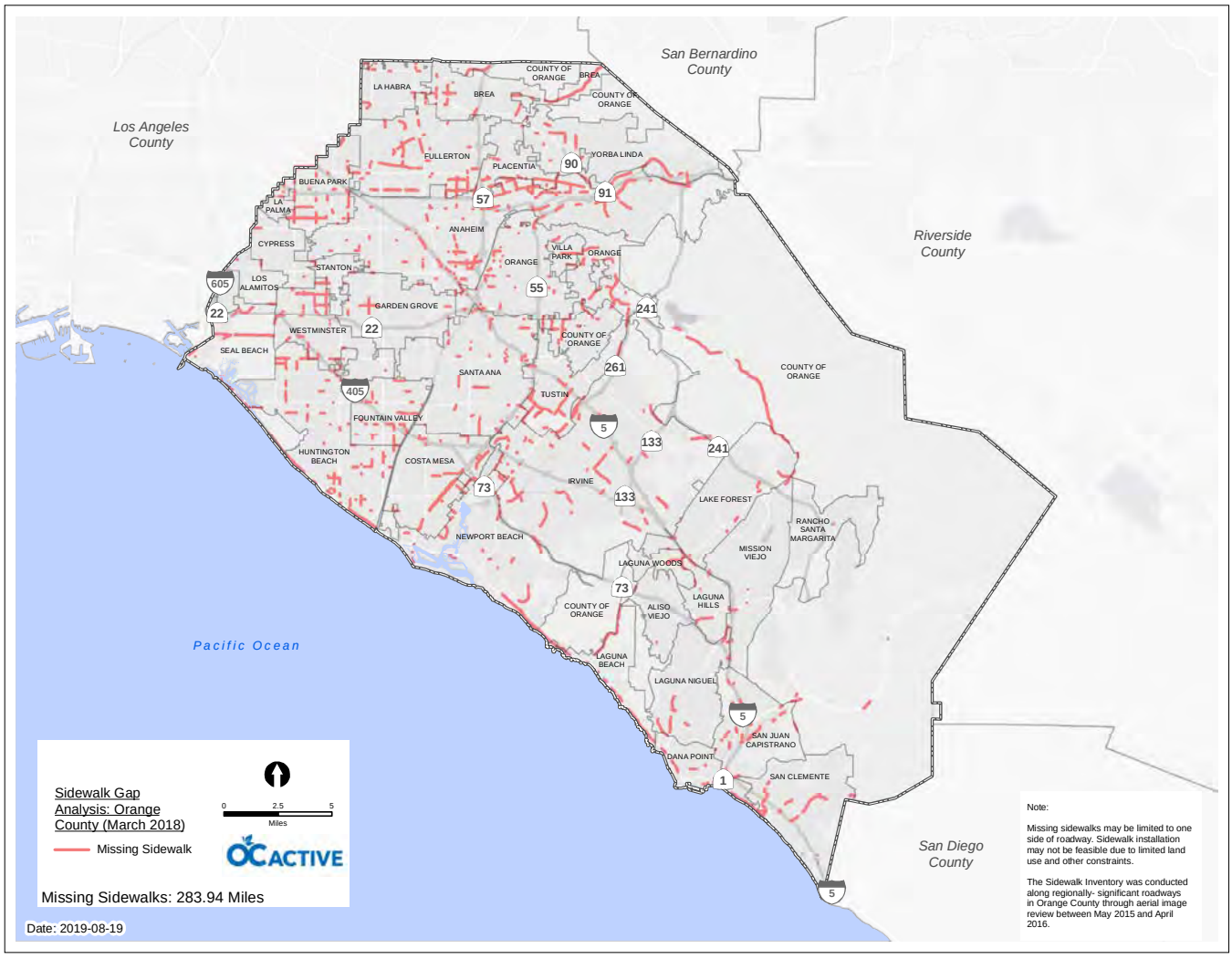


Figure 3.2 – Countywide Missing Sidewalks Map

This page intentionally left blank.

4 BICYCLE NETWORK

Orange County currently has over 1,206 miles of existing on-street and off-street bikeways. The 34 cities and the County collectively have identified an additional 888 combined miles of planned on-street and off-street bikeways that would further expand and enhance the countywide bicycle network. Taken together, the network of existing and planned bikeways across the county would create an integrated network of on-street and off-street bikeways that would provide convenient and safe connections to employment, schools, and recreation opportunities. Figure 4.1 shows the countywide network of existing and planned bikeways.

Existing bikeways in Orange County primarily consist of on-street bike lanes (Class II), and off-street paved bikeways or multi-use trails (Class I). These two classifications also represent the majority of planned bikeways in the county. Select Orange County cities are exploring the implementation of cycletracks (Class IV) facilities, and several cities, including Fullerton and Santa Ana, are planning for or already implementing enhanced bike routes (Class III) facilities often refereed to as Bicycle Boulevards, or neighborhood greenways.

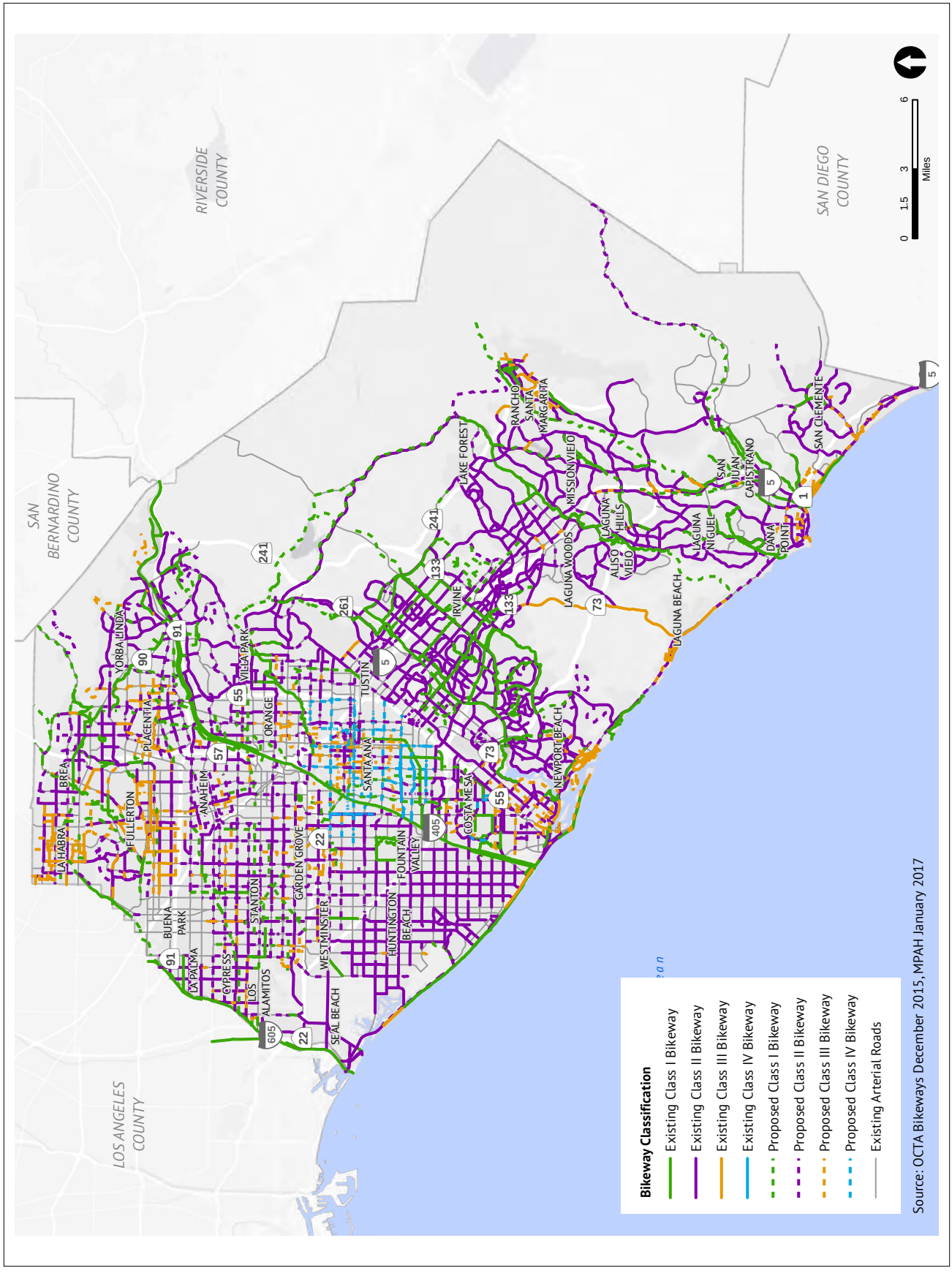


Figure 4.1 – Orange County Local Bicycle Network

Context

Implementation of local bikeways is the purview of the responsible local jurisdiction, whether that be a city or the county. OCTA provides regional planning assistance and potential funding for the design and implementation of new bikeways projects through the Bicycle Corridor Improvement Program (BCIP). OCTA has previously led the development of four regional bikeway planning documents, which identified 41 potential regional bikeway corridors that link destinations throughout the county. Numerous local cities in the county have also recently completed active transportation plans, or are currently in the process of developing these plans.

This section of OC Active gathers together in a single location input from local cities regarding existing and planned bikeways and the 41 regional bikeway corridors identified through OCTA's past Supervisorial District Bikeways studies. Using criteria from the BCIP and the State's Active Transportation Program (ATP), a proposed prioritization of planned local bikeways is provided on a city-by-city basis. For those cities with an adopted ATP, OC Active carries over that particular city's recommended prioritization. Further examination of the proposed regional bikeway network has also occurred as part of the OC Active planning process. Building on the success of the OC Loop project in North Orange County, OC Active identifies three new proposed countywide regional bikeway corridors or loops that would be further prioritized and advanced by OCTA and the associated local jurisdictions for design and implementation.

The discussion of the Orange County bicycle network is organized as follows:

- Section 4.1 provides an overview of the criteria used to develop the proposed prioritization of local bikeways by jurisdiction
- Section 4.2 presents the local bikeway networks and prioritization by jurisdiction (34 cities and county)
- Section 4.3 presents the regional bikeways previously identified through the Supervisorial District Bikeway studies and the proposed Orange County Connectors

4.1 Bikeway Strategy Criteria

The prioritization criteria used in the review of planned local bikeway improvements builds on the criteria utilized by OCTA in the development and prioritization of bikeways in the Supervisorial District Bikeway studies. The criteria have been refined to better align with the current evaluation criteria used by OCTA for the local Orange County BCIP funding program, as well as the criteria used by the State of California in the ATP funding program. Alignment with funding programs will help local jurisdictions secure funds to address financial need. As noted previously, when a local City has recently adopted an ATP, the prioritization shown in OC Active defers to the local jurisdiction's proposed prioritization of local bikeways. This ensures that OC Active provides consistency between the local and countywide planning documents.

This section summarizes each of the criteria used to develop the proposed local bikeway prioritization. An overview of each criteria is provided, along with the identification of the weight assigned to each item.

Table 4.1 below summarizes the criteria and weighting utilized in the prioritization. Please refer to Appendix for additional details regarding the local bikeways prioritization criteria.

Table 4.1 – Bikeway Prioritization Criteria

Criteria	Description	Weight
Level of Traffic Stress	Addresses perceive safety related to existing bikeway type and posted speed limits. There are four levels of traffic stress. Corridors with higher level of traffic stress are scored higher and represent a higher priority for treatment.	1
Reported Collisions	Addresses safety through five years of reported crash data, normalized by crashes per mile. Unlike motor vehicle crash data, the lower volume of bike crashes and lack of robust, long term exposure data (i.e. number of bicyclists using each corridor) means that this dataset is not as statistically sound. However, it is still commonly reported and easily understood. Corridors with higher collisions per mile are scored higher.	1
Economic Efficiency	Measures the financial benefits associated with the corridor, normalized by the number of anticipated users (which is in turn a product of the facility type, population density along the corridor and length), and divided by planning level construction costs estimates.	0.75
Trip Demand	Based on the Bicycle Priority Index (BPI). The BPI, which was developed by OCTA and accounts for various factors that influence bicycle usage including population and employment density, land use, local schools and transit.	0.75
CalEnviroscreen	CalEnviroScreen is a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution.	0.5
Physical Constraints	A tally of physical constraints such as right-of-way, on-street parking, freeway ramps, and other “chokepoints”. Fewer constraints result in a higher score as the corridor will be easier to implement.	0.5
Completes the Network	Regional corridors which connect to other regional and local bikeways to help complete the bikeways network. Measured by the number of intersections with other existing and proposed bikeways. Proximity to the bikeway network is also included in the BPI.	0.25
Completes the Corridor	Proportion of the corridor that is already built to at least minimum Caltrans standards for the bikeway type that is being proposed. This helps to prioritize corridors which are already partially built.	0.25

1. Level of Traffic Stress (LTS) **Weight: 1.0**

The ability of a bicyclist to navigate corridors safely and comfortably depends on a variety of factors. These factors together determine the level of traffic stress that the bicyclist may experience along a certain corridor. Lower levels of traffic stress mean that the corridor is suitable for most cyclists, including children, while higher levels of traffic stress signify a corridor that is only suitable for more experienced cyclists who will ride in almost any setting. These resulting categories have the following definitions:

- LTS 1, suitable for almost all cyclists, including children trained to safely cross intersections
- LTS 2, suitable to most adult cyclists but demanding more attention than might be expected from children
- LTS 3, suitable to many people currently riding bikes in American cities
- LTS 4, suitable to very few people, the "strong and fearless" cyclists who will ride in nearly any setting

To measure existing levels of traffic stress throughout Orange County, a scoring model was applied to each Master Plan of Arterial Highways (MPAH) roadway segment. This analysis approach was developed in 2012 by the Mineta Transportation Institute and was modified by the project team to incorporate average daily traffic (ADT) and roadway classification in place of speed. Although speed would have been a more desirable attribute to use for this modeling as it has a stronger correlation with bicycle safety, it was not available in GIS format for the entire study area. Roadway classification was only used for a few segments that did not have recorded ADT values.

The factors considered in this analysis for each MPAH road included:

- Average Daily Traffic (ADT)
- Existing bikeways and their respective facility class
- Road classification
- Number of lanes

The scoring system used to classify each segment is found in the Appendix. Values were assigned to each condition based on original guidance from the 2012 Mineta study and augmented by the project team's knowledge of stressful cycling conditions based on field observations and industry experience. Please note that all Multi-Use Pathways, or Class I facilities, are automatically scored as LTS 1. The results were intended to identify high-stress areas that could benefit from improvements to the bicycle network as well as to highlight low stress pathways that could be developed into alternative routes.

An overwhelmingly large portion of roads in the northern portion of the County have the highest levels of traffic stress, mostly consistent with areas that were shown to be missing bikeway infrastructure. Coast Highway is also almost entirely classified as LTS 4, as are many high traffic volume arterials. Results also highlight many areas that score in the LTS 1-2 range that could be developed as alternative routes given minor improvements and intersection treatments.

2. Reported Collisions **Weight: 0.75**

This criterion addressed safety through five years of collision data, normalized by collisions per mile of recommended facility. The data was provided by the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). Unlike automobile crashes, the lower volume of bike crashes and lack of robust, long term exposure data (i.e. number of bicyclists using each corridor) means that this dataset is less statistically sound than others. However, it is still commonly reported and easily understood.

3. Trip Demand (OCTA Bicycle Priority Index) Weight: 0.75

The Bicycle Priority Index (BPI) was updated for this project and evaluates how bicycle usage and demand is linked to areas in Orange County with high population and employment density, key land uses such as local schools and destinations, as well as location of key transit centers and existing bicycle amenities. The following data are used as origins and destinations in the BPI model:

- Origins
  - Population density (Base year 2015)
  - Population growth (2015 to 2035)
  - Population density less than 18 years old (US Census ACS)
  - Existing land-use mix (2012 SCAG Land Use)
  - Bicycle to work (US Census ACS, 2016)
  - Proximity to existing bicycle network
- Destinations
  - Employment density (Base year 2015)
  - Employment growth (2015 to 2035)
  - Universities / colleges (Enrollment)
  - Metrolink rail stations (AM alightings)
  - Schools (Elementary, Middle, High Schools)
  - Parks, beaches, local retail / public services
  - Bus stops (PM trips)
- BPI score: 0 – 100. Scores for origins and destinations are weighted and added. Higher numbers represent a higher estimated potential demand and therefore a higher priority for treatment. The BPI is summarized for each proposed project using a quarter-mile buffer.

4. Economic Efficiency Weight: 0.75

Measures the financial benefits associated with the corridor, normalized by the number of anticipated users (which is in turn a product of the facility type, population density along the corridor and length), and divided by planning level construction cost estimates. The methodology for the analysis was taken from the National Cooperative Highway Research Program (NCHRP) 552.

Using the Benefit-Cost Analysis of Bicycle Facilities method in Chapter 4 of the NCHRP Report 552, ¼-mile ½-mile, and 1-mile buffers were drawn along each corridor to summarize American Community Survey (ACS) population and journey-to-work mode share data. An extrapolation of all bicycle trips was made and estimates of potential ridership developed based on Class 1 bicycle path or Class 2 bicycle lane attractiveness functions defined in the NCHRP research. Cost-savings benefits were calculated by using the existing and estimated ridership, annual mobility, health, recreation, and reduced auto use estimates.

The assumptions in the NCHRP method were modified to more conservative values (for example, rather than assuming a new corridor facility would result in usage by new riders 365 days per year, usage was estimated for only 12 days per year). All benefit figures have been calculated using the original dollar values rather than

updated to 2014 values, which results in more conservative benefit-cost ratios. These specifications and conservative assumptions are considered appropriate given the high level comparative nature of the assessment.

The economic evaluation assumed a 30-year analysis period, 0.57% annual population growth rate, and a 5% discount rate. The net present value of benefits was divided by cost.

The calculation methodology is comprised of the following categories of data and calculations to determine the benefit-cost ratio (BCR). See the NCHRP Report 552 for detailed information and full description of the benefit-cost ratio methodology.

American Community Survey (ACS) Data – contains data used to determine the following information based on the ACS data and the NCHRP Report 552 methodology.

- Total Population
- Adult Population
- Workers 16+
- Bike Commuters (Bicycle Only)
- Bicycle Mode Share (mean percentage within buffer)
- Adult Population (not cumulative)
- Commuters (Workers 16+)

Calculated Rates – contains the total bicycle rates calculated using the bicycle mode share and the formula provided in the NCHRP Report 552 methodology to calculate the following adult bicycling rates:

- Low
- Moderate
- High

Existing Adult Bicyclists – uses the adult population and the "low" "moderate" and "high" calculated adult bicycling rates to determine the following existing adult bicyclists rates:

- Low
- Moderate
- High

New Adult Bicyclists – uses the bike commuters value and the calculated existing adult bicyclists values and the multipliers for each buffer (1/4, 1/2, and I-mile), provided in the NCHRP Report 552 methodology, to calculate the new bike commuters for the following categories:

- Bike Commuters
  - Best
- Adult Bicyclists
  - Low
  - Best
  - High

Annual Mobility Benefits – calculates the commute trips per year using the formula provided in the NCHRP Report 552 methodology but modified to be more conservative (using 48x4x1.9 instead of the 50x5x2 recommended in the NCHRP Report 552 methodology). This also uses the percentage of the sum of existing and proposed Class I bikeway lengths divided by the total corridor length to determine the percentage of Class I bikeway facilities. It then calculates the annual mobility benefits for existing and new bike commuters using the sum of calculated existing and new bike commuters, percentage of Class I bikeway facilities, and the per-trip benefit dollar value (from NCHRP methodology) for both Class I and Class II bikeway facilities and the calculated commute trips per year.

- Bike Commuters (Existing + New)

Annual Health Benefits – uses the annual per-capita cost savings from physical activity of $128, provided from the NCHRP Report 552 methodology, and the "low", "best", and "high" calculated new adult bicyclists to calculate the annual health benefits of new adult bicyclists for the following categories:

- Low
- Best
- High

Annual Recreation Benefits – uses the calculated "low", "best", and "high" new adult bicyclists, the calculated new bike commuters, the days per year of bike recreational use, and the "typical" day which is valued at $10, based on the NCHRP Report 552 methodology, to calculate the Annual Recreation Benefit for the following categories:

- Low
- Best
- High

Annual Reduced Auto Use – uses the calculated new bike commuters, the savings per mile, each way trip distance value, and the calculated commute trips per year to calculate the annual reduced auto use benefit for new bike commuters. Savings per mile and each-way-trip distance values were provided in the NCHRP Report 552 methodology.

Combined Benefits – is the sum of annual mobility, health, recreation, and reduced auto use benefits.

NPV Combined Benefits – uses a 30-year analysis period, an annual population growth rate of 0.57%, and a discount rate of 5% (values provided in the NCHRP Report 552 methodology) to calculate the NPV combined benefits for the following categories:

- Low
- Best
- High

Cost – is the value calculated from the planning-level construction cost estimates calculated for each corridor, which do not include right-of-way, utility impacts, and maintenance costs. Cost for

Benefit Cost Ratio (BCR) – uses the "Low", "Best", and "High" NPV combined benefits and the construction cost estimates to calculate the BCR for the following categories:

- Low
- Best – This is the BCR value used in the corridor ranking analysis
- High

Existing Bikeways – lists the length (in miles) of Class I, II, and III existing bikeway facilities for each corridor.

Proposed Bikeways – lists the length (in miles) of Class I, II, and III proposed bikeway facilities for each corridor.

Total Bikeways – lists the total mileage of each class type (existing + proposed) for each corridor.

Total Bikeways (All Classes) – lists the total length (in miles) of all bikeway class types (total corridor length).

5. CalEnviroScreen 3.0 Weight: 0.5

CalEnviroScreen is a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution. CalEnviroScreen has been successfully used to inform the implementation of many policies, programs and activities throughout the state. CalEPA and its boards, departments and office continue to use the tool to administer environmental justice grants, promote greater compliance with environmental laws, prioritize site-cleanup activities and identify opportunities for sustainable economic development in heavily impacted neighborhoods.

CalEPA has used this tool to designate California communities as disadvantaged pursuant to Senate Bill 535. SB 535 requires CalEPA to identify disadvantaged communities based on geographic, socioeconomic, public health and environmental hazard criteria. For example, the past few Caltrans Active Transportation Program grant cycles have used CalEnviroscreen as a determining factor of a disadvantaged community. Any census tract that is 75% or greater is determined as a disadvantaged community. For this bikeway prioritization exercise, the number of census tracts are tallied if they fall within a quarter-mile of the project corridor.

6. Physical Constraint Weight: 0.5

A tally of physical constraints such as right-of-way, on-street parking, and other “chokepoints”. Fewer constraints result in a higher score, as the corridor will be easier to implement.

This criterion is a subjective assessment of freeway crossings, on-street parking impacts, channel crossings, railroad crossings, slope, the number of unsignalized street crossings, the need for roadway infrastructure/bridge or bridge crossings, need for roadway widening, and the ratio of existing versus proposed bikeways. Lower scoring corridors are considered easier to implement and are therefore prioritized for treatment.

- Slope – The average slope per project was calculated using a buffer distance of 100 feet.

7. Complete the Network **Weight: 0.25**

This factor is measured by the number of intersections that a proposed facility has with existing facilities, normalized by the length of the proposed facility as to not favor projects of longer length. This factor is closely related the bikeway proximity measure in the BPI but is focused on rewarding the "buildout" of the network rather than proximity to travel demand.

8. Completes the Corridor **Weight: 0.25**

The portion of the corridor that is already built to meet minimum Caltrans standards for the bikeway type that is proposed. This helps to prioritize corridors which are already partially built.

This factor is assessed by a ratio of total length of proposed bicycle facilities to the total length of the corridor. A high ratio (near 100%) means that the corridor has no existing bikeways to build on. Corridors with existing facilities are higher priority for treatment.

4.2 Local Bikeway Network

The local bikeway network presented in OC Active reflects adopted plans for existing and planned bikeway facilities for the 34 cities and the County of Orange. Local bikeways are an essential part of the countywide active transportation network. These facilities provide important convenient and safe connections to employment, schools, and recreation. A well-connected local bikeway network also helps to encourage more travel by bicycle, helping local jurisdictions and OCTA reduce automobile congestion and meet regional goals for reducing greenhouse gas emissions and vehicle miles travelled.

Maps showing the prioritized bikeways for each local jurisdiction within Orange County can be found in the Appendix. Unincorporated portions of the County of Orange are grouped together for various portions of the county and presented following the local city maps.

4.3 Regional Bikeways

OCTA conducted an extensive multi-year effort to prepare four separate Regional Bikeway Strategy studies to identify a network of regional bikeways that would connect cities throughout Orange County. These four studies identified a network of 44 regional interconnected bikeways across the county. Figure 4.2 illustrates the alignment of these proposed regional bikeways. While the best effort was made to identify the most likely routing of regional bikeways, further refinement of the precise alignment is expected.

The regional bikeway planning effort in OC Active was focused on building on this base of existing and proposed regional bikeway facilities to identify a smaller number of interconnected bikeways that could be combined and branded into a focused subset of regional bikeway projects, where OCTA and local cities could partner to pursue funding and implementation.

OCTA has experienced success with this type of approach, working with the County of Orange and several local cities to advance the implementation of the OC Loop, a 66 mile walking and biking network that would create a continuous loop of interconnected bikeways in North and West Orange County. A goal of the regional bikeway planning effort conducted as part of OC Active was to identify additional cohesive and branded regional bikeway projects similar to OC Loop, catalyze future implementation, and support funding pursuits.

In coordination with the study SWG, the 44 regional bikeways were grouped into four larger corridors that could become regional corridors of emphasis, similar to OC Loop. Based on input received from the SWG, the following attributes and objectives were emphasized in the identification of the Regional Connectors.

- Creation of links through linear bikeway corridors that could emphasize and promote commuter trips for cyclists. Linear corridors could also improve connections to loop corridors that are typically used for recreational riding.
- Connections to transit. Convenient transit connections help to increase the distance that cyclists can travel.
- Improve connections to employment and activity centers, particularly through the improvement of linear bikeway corridors.

The project team and OCTA staff then reviewed the larger regional corridors and identified OC Loop and three new corridors that best achieved the objectives and priorities identified by the SWG. The three new corridors are:

- Central County Connector
- South County Connector
- Cross-County Connector

Each of these regional connectors would provide direct bikeway routes that would connect to several major trip generators throughout the county, including rail transit stations, employment centers, educational facilities, and regional shopping and activity centers. Each Regional Connector also has unbuilt segments or existing segments where improvements and enhancements would appeal to a greater number of people. The following layered

network identified in OC Active provides excellent opportunities for improvements to link with both local and regional destinations across the county:

- Regional Connectors
- Regional Bikeways
- Local Bikeways

Figure 4.3 highlights the proposed alignment of the OC Loop and three new regional connectors.

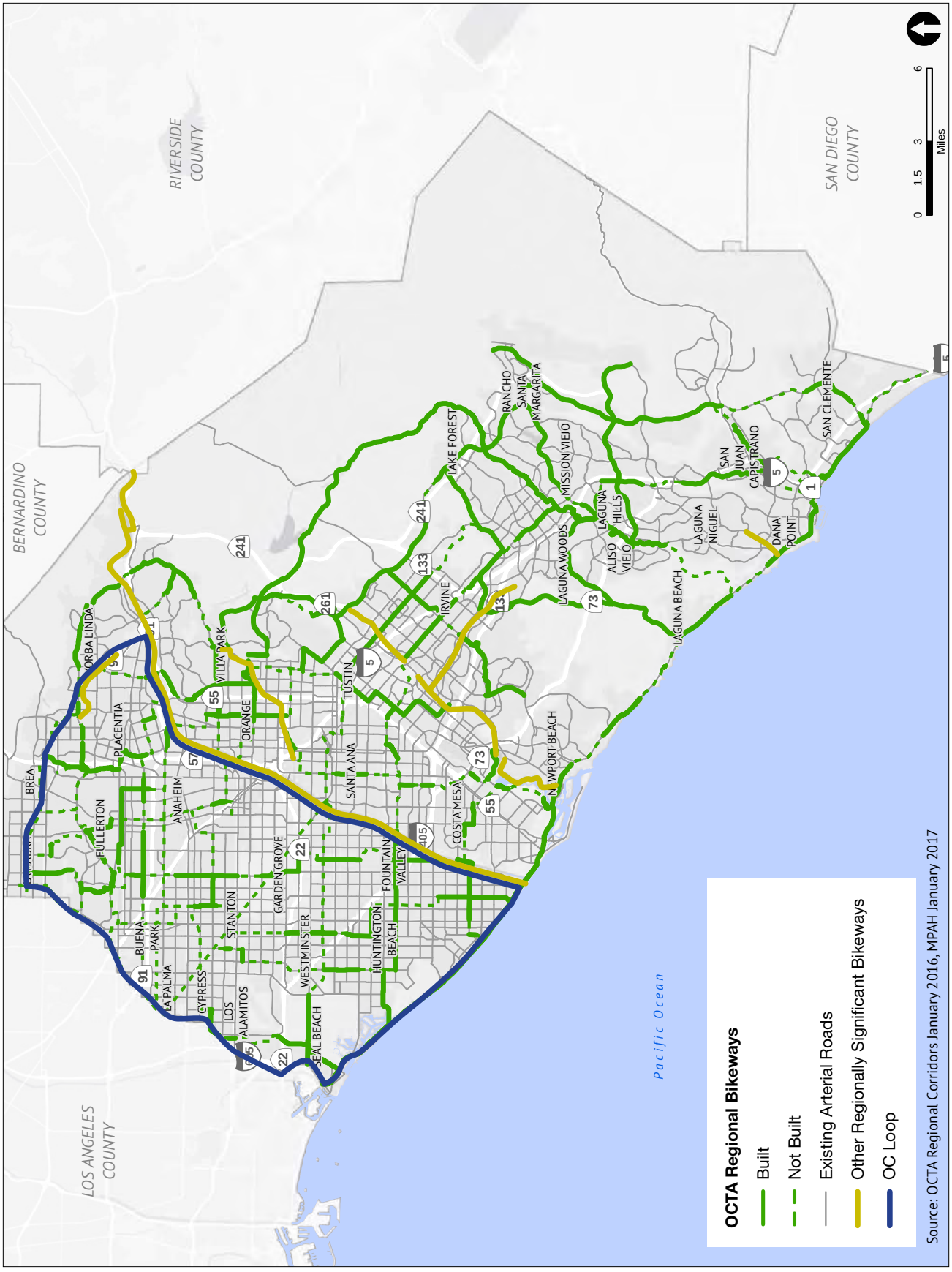


Figure 4.2 – Orange County Regional Bikeways

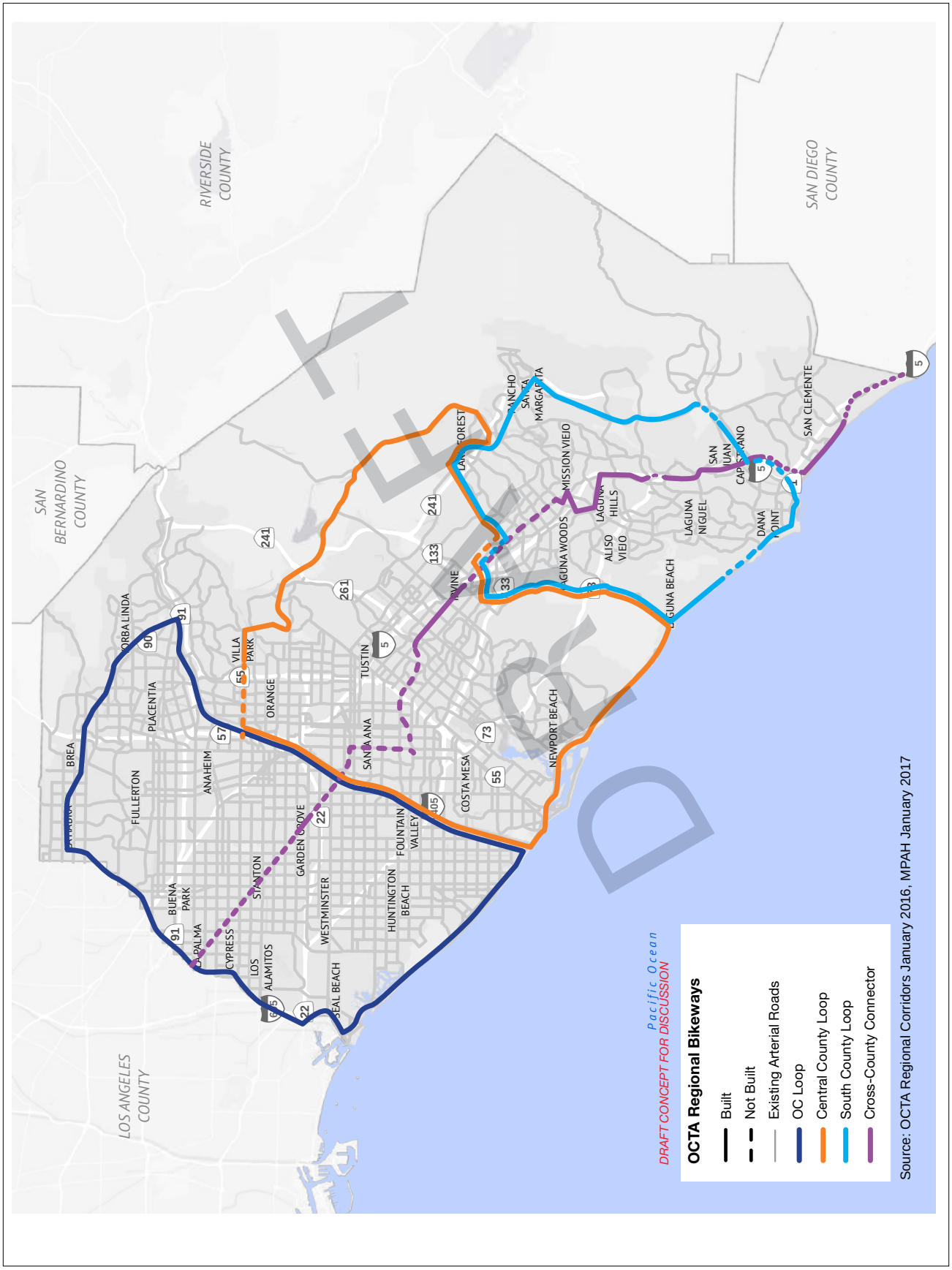


Figure 4.3 – Priority Regional Bikeway Projects for Implementation

5 ACTIVE TRANSPORTATION SUPPORTING PROGRAMS

5.1 Existing Programs

Safer bicycling and walking conditions are best achieved through a combination of strategies targeted to address both infrastructure and non-infrastructure needs. The strategies known as the Five E's – Education, Encouragement, Enforcement, Evaluation, and Engineering, are a universal planning framework and approach to improving roadway safety. This section addresses three of the five E's related to non-infrastructure efforts: Education, Encouragement, and Enforcement.

- Education:
  - Bicycle and pedestrian education campaigns can help local jurisdictions communicate the skills and knowledge necessary to be safe bicyclists and pedestrians. They help inform community members of traffic laws, facilitate safe bicycling and walking behavior and practices, and communicate common unsafe bicycle and pedestrian practices that lead to collisions. Education campaigns can include a variety of tools such as community outreach, developing local bicycle and pedestrian safety guides, hosting safe routes to school education workshops, and more.
- Encouragement:
  - Encouraging bicycle and pedestrian activity helps to generate excitement and brings awareness to the benefits of active transportation. It can also help foster public support for bikeway and pedestrian infrastructure projects and policies that are geared towards improving safety on streets. Tools to encourage bicycle and pedestrian activities include promoting national and local active transportation events, implementing local demonstration events, and adopting local policies and programs that support safe and efficient active modes of transportation.
- Enforcement:
  - Consistent enforcement of traffic laws is an important tool local jurisdictions can use to improve bicyclist and pedestrian safety and reduce the risk of severe and fatal collisions. Enforcement activities target behaviors that impact bicyclist and pedestrian safety, such as speeding, driver impairment, and distraction. They can take on a variety of forms, such as enforcement of traffic violations, safety patrols on major arterial streets, radar speed signs, and more. Engaging law enforcement representatives brings new ideas and solutions to reduce the frequency of traffic collisions.

Table 5.1 summarizes current programs supporting active transportation occurring each city in Orange County, as well as countywide programs. Additional programs may exist throughout the county as new projects and efforts occur.

Table 5.1 – Active Transportation Programs by City

City	Education
Aliso Viejo	**Bike Rodeos** – Orange County Sheriff's Department (OCSD) sponsors bike rodeos upon request.
Anaheim	**Employer based programs** – The Anaheim Transportation Network (ATN) partners with the Orange County Bicycle Coalition to provide educational sessions to employers. **Anaheim Fire & Rescue "Wear Your Helmet Like A Pro" Program** – The program focuses on helmet safety education for children ages 5 to 14. In collaboration with OCTA a flyer was developed promoting the program, voluntary bike registration and safety tips for people walking and biking. **Anaheim Police Department Traffic Safety Program** – The program emphasizes bicycle, pedestrian, and automobile safety to help all ages safely navigate through the City, presented in five modules with age appropriate curriculum: Kindergarten - 6th grade, Junior High School, High School, Adults and Seniors, and Homeless Outreach. The program is in partnership with the City's Community Services and Public Works Divisions, seven school districts, and non-profit partner Coast to Coast. It is partially funded through a grant from the Office of Traffic Safety.
Brea	**Bike Safety event** – The Brea Police Department holds a bike safety event at the Boys and Girls Club every year with a guest speaker, a cone pattern for the children, and the opportunity to see police vehicles and meet officers.
Buena Park	N/A

Encouragement	Enforcement
N/A	N/A
Cruise with a Cop – 1 mile bike ride with APD officers, a bike rodeo for kids, helmet fittings, bike registration (2018) Source: https://www.anaheim.net/civicalerts.aspx?aid=1244 **Bike Week events** – The Anaheim Transportation Network (ATN) organizes community events during Bike Week in May and provides employees with safety items such as helmets, lights, and locks. **Safe Routes to School (SRTS) program** – The City of Anaheim has implemented SRTS program through funding sources such as the State's Active Transportation Program. **AHOC Active Transportation Leadership Program** – Funded through a grant from the CDC and the California Endowment, the Alliance for a Healthy Orange County (AHOC) developed a program to engage students at Anaheim High School for better understanding of local, regional, and state policies related to active transportation. **Connect the Loop Event** – The SCAG Go Human campaign hosted a demonstration event linking the Santa Ana River Trail to the El Cajon Trail in the Yorba Linda and Anaheim area. The day-long event illustrated improved connections through wayfinding, signage, and a temporary parking separated bikeway (Class IV). Additionally, a bike rodeo was hosted for youth attending the event. The June 10, 2017 event included collaboration between the SCAG, OCTA, County of Orange, and the Cities of Anaheim and Yorba Linda.	**California Vehicle Code enforcement** – The APD enforces the California Vehicle Code, including violations involving bicyclists. Both the APD and Anaheim Fire & Rescue respond to collisions involving bicyclists.
Helmet giveaway – The City led a giveaway for low-income children who live adjacent to a trail in the city. The helmet distribution event was funded by the OC Health Care Agency (OCHCA) (March 2016). **Trail Segment Grand Opening** – Ceremony with mayor and several other City officials held in the new parking lot of a trail segment centrally located near Downtown Brea (March 2016). **Go Human Campaign event** – Over 400 residents participated at the SCAG Go Human "Experience The Tracks at Brea" event on a trail segment almost a mile long, which included bike and helmet safety checks from a local bike shop and OCHCA. The event provided pop-up furniture, bikes to borrow, giveaways from a local sporting goods store, morning snacks donated by local businesses, a children's bike rodeo, and a chance to explore a fire engine. Updates were also provided regarding the completion of the 4-mile trail, summer programs, and OCTA programs (May 2017). **The Tracks at Brea Grand Opening** – This ribbon cutting ceremony celebrating the completion of the 4-mile, 50 acre linear park through the City included promotional items and maps, and allowed attendees to walk and bike the trail (May 2018).	N/A
N/A	N/A

City	Education
Costa Mesa	**City of Costa Mesa Elementary School Bicycle Safety Education Program** – Safety events were hosted at multiple schools in 2015, consisting of an educational workshop and on-bike bicycle rodeo. Source: City of Costa Mesa Active Transportation Plan **Community Wide Bicycle Education Program** – In addition to the elementary school workshops, the City conducted five public bicycle rodeo events that were completed in June 2016. These events were funded through a grant from OCTA's Bicycle Corridor Improvement Program (BCIP). Source: City of Costa Mesa Active Transportation Plan
Cypress	**Bike Rodeo with Bicycle Safety** – The Landell Cub Scouts host a bike rodeo annually with the City leading a 20-30 minute presentation on basic bicycle safety. **Positive Actions Through Character Education (P.A.C.E.) Program** – The program addresses juvenile laws with local 6th graders, including a discussion of bicycle safety.
Dana Point	N/A
Fountain Valley	**School Bicycle Safety Program** – The Fountain Valley Police Department held its first "School Bicycle Safety Program" at Cox Elementary in June 2016. Four Bike Patrol Officers conducted an educational program for third and fourth grade students on proper bicycle safety. The one-day program consisted of a presentation and bicycle obstacle course. Source: https://www.fountainvalley.org/DocumentCenter/View/4294/Bike-Safety-Program?bidId=
Fullerton	N/A

Encouragement	Enforcement
First Friday Road Show and Bike Rodeo – As part of the First Friday Road Show event on July 3, 2015, the City of Costa Mesa's Bicycle Safety Education Program conducted a rodeo for children to learn bicycle safety skills. Children were able to ride through a miniature city featuring streets, sidewalks, intersections, traffic signs, cars, trucks and buses. A giant stop sign and traffic light costume characters engaged youth to remind children to "stop, look and listen." Source: http://www.costamesaca.gov/Home/Components/News/News/2142/40?arch=1&seldept=20&selcat=35 **Walk to School Day** – In collaboration with OCTA Walk to School Day (WTSD), events were hosted at three elementary schools on International WTSD in October 2017.	**Selective Enforcement Near School Zones** – active enforcement of vehicle code laws in and about school zones, both in the morning and afternoon. Source: http://www.costamesaca.gov
N/A	N/A
Bike Valet Service for the Doheny Blues Festival – 2010 Bike Valet Service at Festival including free water and bike tune ups. Source: http://www.danapoint.org	N/A
N/A	N/A
N/A	**Fullerton Police Pedestrian Safety Enforcement** – campaign funded by the California Office of Traffic Safety, through the National Highway Traffic Safety Administration to promote public awareness aimed at both drivers and pedestrians alike to always be aware of each other and share the road responsibly. (2017) Source: https://www.fullertonpd.org/civicax/inc/blobfetch.aspx?BlobID=23543

City	Education
Garden Grove	N/A
Huntington Beach	**Bicycle and Pedestrian Safety Class** – Free class on the second Saturday of each month for younger citizens to learn safe roadway behavior, especially how bicyclists, pedestrians and motorists share the road. Source: https://www.huntingtonbeachca.gov/government/departments/pd/traffic/bicycle-pedestrian-safety-class.cfm

Encouragement	Enforcement
Safe Routes to School – To encourage more students to walk and bike to school, and for their safety, the City's Public Works Department will be installing additional pedestrian safety signs, school crosswalks, "Slow School Xing" and "Keep Clear" pavement markings, red curbs at various locations to improve sight distance, and signs restricting on-street parking near both schools. (2018) Source: https://ggcity.org/news-and-events/safe-routes-school-plan-opens-phase-1 **Re:Imagine Garden Grove-Open Streets** – Citywide initiative aimed at creating unique public spaces through innovative and fun experiences, while promoting a bike-friendly and pedestrian-friendly city. Source: https://ggcity.org/news-and-events/city-receives-awards-excellence-reimagine-garden-grove-open-streets **Open Streets Event** – co-sponsored by Go Human, the city hosted the 3rd annual Open Streets event in 2017. Source: https://ggcity.org/news-and-events/city-announces-25-mile-route-open-streets-event **Redefine Hazard Avenue Event** – The SCAG Go Human campaign hosted a demonstration event on Hazard Avenue to consider a potential redesign of the roadway to include buffered and separated bikeways in front of James Irvine Intermediate School. The October 21, 2017 event included collaboration between the SCAG, OCTA, County of Orange, and the Cities of Garden Grove, Santa Ana, and Westminster.	**Walk to School Day** – High visibility enforcement and participation by Garden Grove Police Department during 2016 Walk to School Day.
N/A	**Ticket Diversion program** – an option for bicyclists and pedestrians who have received a traffic violation to take a safety class in lieu of paying a hefty fine (2016) Source: http://gohumansocal.org/Documents/Tools/CaseStudy_HuntingtonBeach.pdf

City	Education
Irvine	**Ring the Bell Campaign** – The City of Irvine is launching a new campaign to encourage bicyclists to "Ring the Bell" as an alert as they approach pedestrians or other cyclists. **Citywide Bicyclist, Pedestrian, Motorist Safety Campaign** – A comprehensive citywide safety program aimed at people who bike, walk, and drive, which promotes active transportation through safe behaviors and attentive interactions among bicyclists, pedestrians, and motorists. **Irvine Shares The Way** – A broad-based campaign launched in 2019 to help raise awareness of traffic laws and remind residents how they can reduce the chances of a collision when they are walking, bicycling, and driving.
La Habra	**Move More, Eat Healthy Campaign** – A campaign to create a healthy La Habra where all residents have opportunities to be physically active, access to reliable nutrition education and healthy, affordable foods where all residents can prosper. (2014) Source: https://www.lahabracity.com/535/Move-More-Eat-Healthy-Campaign
La Palma	N/A
Laguna Beach	**Bike Rodeo & Road Safety Expo** – This free event will encompass safety information for all roadway users including Cyclist, Pedestrians, and Motorists. Whether you drive a vehicle, ride your bike, or walk, your safety depends on sharing the road safely with other vehicles and users. (2016) Source: http://www.lagunabeachcity.net/news/displaynews.htm?NewsID=1118&TargetID=1 **Bike Safety Pamphlet** – The Laguna Beach Police Department offers a cyclist guide to bike safety while riding on the streets of Laguna Beach, including laws, hand signals, and safety tips. Source: http://www.lagunabeachcity.net/documents_Large/BikeSafetyPamphlet.pdf
Laguna Hills	**Bike Rodeos** – Orange County Sheriff's Department (OCSD) has sponsored safety and educational bike rodeos in the past years and efforts continue annually.
Laguna Niguel	**Walk to School Day** – Members of City Council will walk with Police Services Department to help educate/remind children who walk to school of proper pedestrian and bicycle safety. Historically occurs in the beginning of October.
Laguna Woods	N/A

Encouragement	Enforcement
UCI WhimCycle – UC Irvine promotes bicycling with a multi-day bike festival that includes information on bike safety, security, and fun. **reCycle Bike Fair** – UC Irvine holds a fair to sell abandoned bikes at reasonable prices for those needing a bike. **BikeUCI Ambassador** – The BikeUCI Ambassadors is a volunteer program for cyclists to share the joys of riding, learning safe cycling practices, and create friendships.	**Bicycle Safety Programs** –The Irvine Police Department, in conjunction with the Department of Community services, has developed many programs to enhance bicycle safety and awareness for school-aged riders. Bicycle rodeos, safety classes, and other programs are offered regularly at Irvine schools. **Bicycle Diversion Programs** – A version of the Bicycle Safety Class has been adapted as an alternative to receiving a formal citation for vehicle code violations associated with riding a bicycle. The bicycle diversion class is similar to that offered by the City of Huntington Beach.
N/A	La Habra Police Department has officers who patrol on bicycles around the city.
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A

City	Education
Lake Forest	**Bike Rodeos** – The City holds bike rodeos every year which teach basic bicycle safety.
Los Alamitos	N/A
Mission Viejo	**School Traffic Safety Flyer** – Intended for those who drive their children to school, this flyer discusses a school traffic safety plan, including safe drop off/pick up areas, street crossing areas, and obeying speed limits and traffic signs. Source: https://cityofmissionviejo.org **Safe Routes to School Information** – On their website, the City provides Safe Routes to School pamphlets for each of the City's schools, which includes a map of the surrounding area with routes, along with pedestrian and bicycle safety tips. The website also lists the locations of school crossing guards for each school

Encouragement	Enforcement
N/A	**Bike and Pedestrian Safety Enforcement Operations** – The Sheriff's Department periodically conducts bike and pedestrian safety enforcement operations which focus enforcement on collision factors involving motorists, pedestrians, and bicyclists. Extra officers are deployed to patrol locations where frequent pedestrian and bike collisions have occurred over the last three years, paying special attention to motorist, pedestrian, and bicyclist behavior that may cause collisions. Funded by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.
N/A	N/A
N/A	N/A

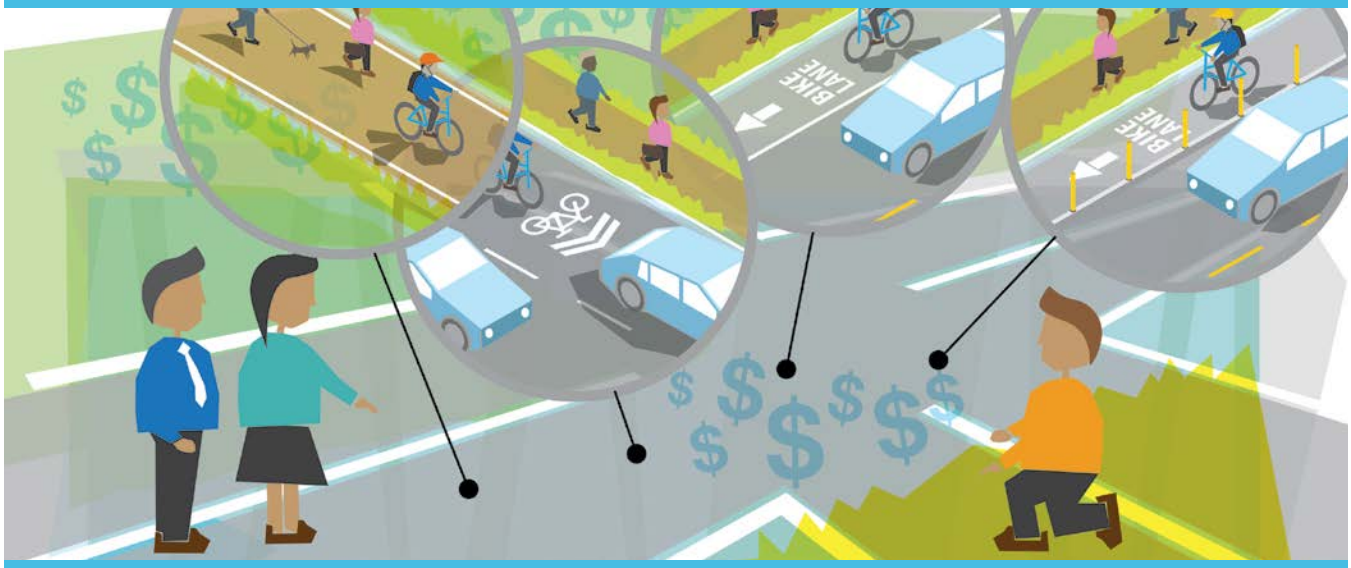
City	Education
Newport Beach	**Bicycle Safety: A Parent's Guide** – The City of Newport Beach offers a number of resources on bike education, including flyers available on the City's website. "Bicycle Safety: A Parent's Guide" provides tips to parents regarding safe bicycle practices for their child. Source: https://www.newportbeachca.gov/home/showdocument?id=45005 **Sharing the Road: Same Roads, Same Rules, Same Rights** – This flyer provides an overview of bicycle and automobile rules and rights, so that bicyclists and drivers may share the road safely. Source: https://www.newportbeachca.gov/home/showdocument?id=45011 **High-Risk Bicycling Situations for Children** – This flyer provides statistics on bicycle - involved collisions to promote awareness of high-risk situations for children bicycling. Source: https://www.newportbeachca.gov/home/showdocument?id=45007
Orange	N/A
Placentia	N/A
Rancho Santa Margarita	N/A
San Clemente	N/A
San Juan Capistrano	N/A
Santa Ana	**Travel Safe, Share the Space** – A public education that bolsters awareness and behavioral change campaign that responds to the challenged of pedestrian and bicyclist safety by encouraging residents and visitors to watch out for each other. Program is funded by a grant from the California Office of Traffic Safety. Source: http://www.santa-ana.org/bike/ **Bike Rodeos** – The City along with local non-profit Kidworks, runs safety fairs focusing on pedestrian safety and bicycle skills as well as free bicycle helmets. Funded by a grant from the California Office of Traffic Safety. Example: http://www.santa-ana.org/bike/documents/Kidworks_Traffic_Safety_Fair.pdf **Confident Cycling Classes** – Annually between 2016 and 2018 a team of local instructors has delivered several introductory traffic skills classes for bicycle riders to teach essential road skills to riders of all levels. Additionally, instructors have been certified using the national bicycle training curriculum. Source: http://santa-ana.org/bike-safety
Seal Beach	N/A

Encouragement	Enforcement
N/A	**Bike and Pedestrian Safety Enforcement Operations** – The NBPD periodically conducts bike and pedestrian safety enforcement operations which focus enforcement on collision factors involving motorists, pedestrians, and bicyclists. Extra officers are deployed to patrol locations where frequent pedestrian and bike collisions have occurred over the last three years, paying special attention to motorist, pedestrian, and bicyclist behavior that may cause collisions. Funded by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
N/A	N/A
Walk to School Day – Annually, multiple schools within the city participate in International Walk to School Day with Education, Enforcement and Health professionals partnership.	**Santa Ana Police Department Transportation Safety Meeting** – Santa Ana Police Department hosts a meeting 3-4 times annually with City Staff and School District Representatives to discuss transportation safety efforts.
N/A	N/A

City	Education
Stanton	N/A
Tustin	N/A
Villa Park	N/A
Westminster	N/A
Yorba Linda	**Bike Rodeo** – A bike rodeo was provided for kids as part of SCAG's Go Human Campaign "Connect the Loop" in 2017.
Orange County	**Brake the Cycle** – OCTA educational campaign to encourage good travel behavior. Source: http://octa.net/Bike/Brake-The-Cycle/ **(B)right** – OCTA educational campaign to promote bicycle and pedestrian visibility in nighttime conditions. Source: http://octa.net/Bike/Bright/?frm=1 **Bike Salmon** – OCTA educational campaign promoting bicycle riding with the flow of traffic. Source: http://octa.net/Bike/Wrong-Way-Riding/ **3 Feet for Safety** – OCTA educational campaign promoting law requiring motorists to give at least three feet of clearance when passing bicyclists in the same direction. Source: http://octa.net/Bike/3-Feet-for-Safety/ **Play it Safe** – OCTA educational campaign promoting good behavior for motorists passing of cyclists and yielding to pedestrians. https://www.octa.net/Bike/Play-It-Safe/ **Smart Cycling** – OCTA program in 2018 and 2019 to host League of American Bicyclists classes in various cities in Orange County that aims to teach bicycling skills and build confidence to ride. Additionally, instructors have been certified using the national bicycle curriculum. Source: https://www.bikeleague.org/ridesmart **OC Parks Trails Subcommittee** – The Trails Subcommittee was established on April 1, 2016 by the Orange County Parks Commission as an advisory body to the OC Parks Commission to address matters regarding County trails and bikeways and provide a public forum for comments on this topic. The Subcommittee meets on a quarterly basis.

Encouragement	Enforcement
N/A	N/A
N/A	N/A
N/A	N/A
Westminster: Experience Hoover Event – The SCAG Go Human Campaign hosted a demonstration event along Hoover, Main, and Olive Streets leading into Sigler Park. Held on May 21, 2016, the event celebrated the completion of the Hoover Street Phase 1 project, and included temporary installations showcasing the concept of a complete street, including vehicle lane reduction and a two-way cycle track.	N/A
Connect the Loop Event – The SCAG Go Human campaign hosted a demonstration event linking the Santa Ana River Trail to the El Cajon Trail in the Yorba Linda and Anaheim area. The day-long event illustrated improved connections through wayfinding, signage, and a temporary parking protected bikeway (Class IV). Additionally, a bike rodeo was hosted for youth attending the event. The June 10, 2017 event included collaboration between the SCAG, OCTA, County of Orange, and the Cities of Anaheim and Yorba Linda.	**Bike and Pedestrian Safety Enforcement Operation Program** – Orange County Sheriff's Department (OCSD) provides contract police services for the City of Yorba Linda. The program periodically conducts bike and pedestrian safety enforcement operations which focus enforcement on collision factors involving motorists, pedestrians, and bicyclists.
OC Loop – OCTA promotion of the OC Loop, vision for 66 miles of seamless connections and an opportunity for people to bike, walk, and connect to some of California's most scenic views. Source: http://www.octa.net/Bike/The-OC-Loop/ **Bike Month Promotions** – OCTA annual May Bike Month campaign to promote travel by bicycle. **Chalk, Walk, & Roll** – Through OC Active, OCTA developed a contest for students to create chalk art pieces related to active transportation activities. **Connect the Loop Event** – The SCAG Go Human campaign hosted a demonstration event linking the Santa Ana River Trail to the El Cajon Trail in the Yorba Linda and Anaheim area. The day-long event illustrated improved connections through wayfinding, signage, and a temporary parking separated bikeway (Class IV). Additionally, a bike rodeo was hosted for youth attending the event. The June 10, 2017 event included collaboration between the SCAG, OCTA, County of Orange, and the Cities of Anaheim and Yorba Linda. **Redefine Hazard Avenue Event** – The SCAG Go Human campaign hosted a demonstration event on Hazard Avenue to consider a potential redesign of the roadway to include buffered and separated bikeways in front of James Irvine Intermediate School. The October 21, 2017 event included collaboration between the SCAG, OCTA, County of Orange, and the Cities of Garden Grove, Santa Ana, and Westminster.	**Orange County Sheriff's Department Bike and Pedestrian Safety Enforcement Operation Program** – The Sheriff's Department periodically conducts bike and pedestrian safety enforcement operations which focus enforcement on collision factors involving motorists, pedestrians, and bicyclists. Extra officers are deployed to patrol locations where frequent pedestrian and bike collisions have occurred over the last three years, paying special attention to motorist, pedestrian, and bicyclist behavior that may cause collisions. Funded by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

This page intentionally left blank.



6 IMPLEMENTATION

6.1 Cost Estimate Data

OC Active includes information regarding the order of magnitude cost associated with the implementation of a range of pedestrian and bicycle improvements. This information and data is presented to assist local agencies in Orange County with developing conceptual level cost estimates for active transportation improvements, which can be utilized to secure funding for implementation efforts.

This cost data has been collected from a variety of sources and recent active transportation projects in Southern California. Cost estimates are subject to change over time, depending on a variety of economic and market factors. Local agencies using the data within this plan should consider proper adjustments and/or escalation factors as appropriate depending on timing and market conditions.

6.1.1 Unit Cost Price List Spreadsheet

OC Active developed a unit cost spreadsheet which includes a price list tab with unit costs for various pedestrian and bicycle improvements, including demolition, signal, striping and landscaping items, and factors for escalation, mobilization and other contingencies. It also includes a template tab to prepare a cost estimate for a specific project.

Sources for unit costs include previous cost estimates prepared for active transportation projects in various locations in Southern California, including Orange, San Diego, Los Angeles, and Kern counties. Cost estimates utilized in this memorandum include estimates from 2017/2018, as well as 2015 and 2013.

6.1.2 Pedestrian Improvements Cost Estimates

The design assumptions for pedestrian improvement projects are based on the Caltrans Highway Design Manual Chapter 400, the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, and the NACTO Urban Street Design Guide.

It is recommended that pedestrian facilities and sidewalks provide for a minimum width of 5 feet, in order to accommodate Americans With Disabilities Act (ADA) requirements and to allow for appropriate widths for pedestrians to avoid impediments, such as telephone poles, streetlight poles, utility boxes, etc. The 5 foot minimum width should be considered as an absolute minimum, and where pedestrian volumes and/or right-of-way availability permits, sidewalk or pedestrian pathway widths of 8 to 10 feet are encouraged. These widths allow more room for pedestrians traveling opposite directions to pass and help to avoid any conflicts with path of travel and fixed objects.

Landscape or hardscape buffers between pedestrian facilities and adjacent traffic lanes are recommended. These buffers help to increase pedestrian comfort levels, provide shade, and reduce potential pedestrian and automobile conflicts.

Table 6.1 highlights typical Rough Order of Magnitude (ROM) capital cost estimates for common pedestrian improvements and supporting infrastructure.

Table 6.1 – ROM Cost Estimates for Pedestrian Improvements

Description	Unit	ROM Cost	Maintenance[1]
5.5'-wide Sidewalk (including curb and gutter)	LF	$75	$5,000 per mile per year. Concrete typically lasts over 30 years in Southern California.
8'-wide Sidewalk (including curb and gutter)	LF	$100	$8,000 per mile per year. Concrete typically lasts over 30 years in Southern California.
10'-wide Sidewalk (including curb and gutter)	LF	$115	$10,000 per mile per year. Concrete typically lasts over 30 years in Southern California.
Pedestrian railing	LF	$110	Nominal maintenance cost.
Street trees	EA	$520	Maintenance varies by type of tree, $150 to $200 per tree per year.
Benches	EA	$1,750	Nominal maintenance cost.
Pedestrian signal with audible notification and countdown timer	EA	$2,000	Maintenance cost includes cleaning, changing of bulbs, and repairs. While audible countdown pedestrian signals typically require more frequent maintenance than other traffic signal equipment, maintenance is typically performed by City staff or contracted out on an as-needed basis, and average maintenance cost data is not readily available.
ADA curb ramp	EA	$3,600	Detectable warning surface materials typically have a life span similar to concrete. If they are damaged, truncated domes/ detectable warning material can be re-fastened with adhesive or screws. Material cost for replacement is about $30 per square foot.
High visibility crosswalk	EA	$5,000	Retroreflective epoxy paint has a lifespan of about 48 months. Thermoplastic markings have a lifespan of about 72 months.[2]
Street lighting	EA	$5,000	Street lights in Orange County are typically maintained by Southern California Edison and paid for by ad-valorem property taxes and assessments.
Shade structure	EA	$12,500	Nominal maintenance cost.
Mid-block crossing with Ped Hybrid Beacon (HaWK signal)	EA	$65,000	Maintenance is typically performed by City staff or contracted out on an as-needed basis, and average maintenance cost data is not readily available.

1. *Actual maintenance costs vary based on local conditions.*
2. *With the temperate climate in Southern California, the determining factor in the longevity of pavement markings is traffic volumes. Markings should be placed to avoid vehicle tires, particularly in turning movement areas.*

RSMeans Construction Cost Indexes can be used to convert national average building costs at a particular time to the approximate building costs for some other time. It is assumed that changes in costs for materials used in active transportation projects are proportional to the changes in costs for building materials, and that the RSMeans cost indexes can be applied to construction cost data from previous years to estimate current costs. Cost data from 2015 was converted to 2018 values by applying a factor of 1.0461. This is based on the RSMeans cost index ratio of 100/95.6 = 1.0461.

Cost data from 2013 was converted to 2018 values by applying a factor of 1.073. This is based on the RSMeans cost index ratio of 100/93.2 = 1.073.
https://www.rsmeansonline.com/references/unit/refpdf/hci.pdf

http://www.dot.ca.gov/design/pjs/coste/Construction%20Cost%20Indices%20%20Forecast%2010-2017.pdf

Additional sources for unit cost data include:
http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

6.1.3 Local Bikeways Project Cost Estimates

The design for the bikeway projects is based on the Caltrans Highway Design Manual Chapter 1000 and the AASHTO Guide for the Development of Bicycle Facilities. Where at least 24 feet of clear width is available for a Class I multi-use trail, a 12-foot wide paved section should be provided with a desired landscaped buffer area on each side. Where the space available for a path is less than 24 feet wide, the minimum section used for a Class I path should have a 12-foot wide paved surface that is free of any fences, walls, or posted objects. A 4-inch yellow dashed line is assumed be striped in the center of the path, with 4-inch white edge lines striped at 2 feet from each paved edge. For segments where a multi-use path runs parallel to an arterial or local street, the edge of the path should be separated from the parallel roadway by at least 5 feet, per the Caltrans Highway Design Manual.

Table 6.2 – ROM Cost Estimates for Bicycle Improvements

Type	Description	Unit	ROM Cost	Maintenance
Class III	Shared lane pavement marking	EA	$200	Retroreflective epoxy paint has a lifespan of about 48 months. Thermoplastic markings have a lifespan of about 72 months. Preformed Tape can last up to 96 months.[2,3]
Class I, II or III	Signage	EA	$200	
Class III	Shared lane markings and signage	Per mile[1]	$8,400	
Class II	Bike lane striping with no other restriping	Per mile[1]	$12,500	
Class II	Restriping of travel lanes to include a Class II bike lane	Per mile[1]	$35,000	
Class II	Buffered bike lane (striping only)	Per mile[1]	$60,000	
Class IV	One-way Cycle Track with 5' raised median - includes pavement reconstruction and C&G, signing, and striping	Per mile	$1,710,000	Maintenance consists of landscaping buffers, sweeping, replacing striping, and maintaining vertical separation materials. The lifetimes of striping materials are noted above. Material cost to replace a flexible post is $35, including adhesive. Rate of replacement depends on local conditions and traffic volumes.
Class IV	One-way Cycle Track with 3' striped buffer - includes pavement reconstruction and C&G, signing, and striping	Per mile	$890,000	
Class IV	One-way Cycle Track with 5' raised median - includes signing and striping (no pavement reconstruction)	Per mile	$930,000	
Class IV	One-way Cycle Track with 3' striped buffer - includes signing and striping (no pavement reconstruction)	Per mile	$100,000	

Table 6.2 – ROM Cost Estimates for Bicycle Improvements (cont'd)

Type	Description	Unit	ROM Cost	Maintenance
Class I	12'-wide multi-use path, 8" thick PCC with subgrade and lighting, not including land cost or landscaping	Per mile	$1,600,000	When properly installed and drained, maintenance for a multi-use path consists primarily of clearing debris, landscaping and lighting. Actual costs depend on local conditions, but trail maintenance is estimated to cost $5,000 per mile per year.
Class I	14'-wide multi-use path, 8" thick PCC with subgrade and lighting, not including land cost or landscaping	Per mile	$1,800,000	

1. *Costs are for one direction of travel.*
2. *With the temperate climate in Southern California, the determining factor in the longevity of pavement markings is traffic volumes. Markings should be placed to avoid vehicle tires, particularly in turning movement areas.*
3. *https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/research_report/chap2e.cfm*

RSMeans Construction Cost Indexes can be used to convert national average building costs at a particular time to the approximate building costs for some other time. It is assumed that changes in costs for materials used in active transportation projects are proportional to the changes in costs for building materials, and that the RSMeans cost indexes can be applied to construction cost data from previous years to estimate current costs. Cost data from 2015 was converted to 2018 values by applying a factor of 1.0461. This is based on the RSMeans cost index ratio of 100/95.6 = 1.0461.

Cost data from 2013 was converted to 2018 values by applying a factor of 1.073. This is based on the RSMeans cost index ratio of 100/93.2 = 1.073.
https://www.rsmeansonline.com/references/unit/refpdf/hci.pdf

http://www.dot.ca.gov/design/pjs/coste/Construction%20Cost%20Indices%20%20Forecast%2010-2017.pdf

Additional sources for unit cost data include:
http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

6.2 Funding Resources

Funding sources for the implementation of active transportation improvements in Orange County include a mixture of Federal, State, and local sources. The matrix presented below as Table 6.3 provides an overview of the various funding sources currently available, a high-level description of the grant/funding source requirements, and discussion of the types or projects and/or project phases that are eligible for funding under each program.

Table 6.3 – Active Transportation Funding Source Matrix

	Funding Source	Program Website	Program Purpose
FEDERAL	Surface Transportation Block Grants - Transportation Alternatives (STBG-TA)	www.fhwa.dot.gov/fastact/factsheets/transportationalternativesfs.com	Creates long-term funding for surface transportation, focusing on smaller-scale transportation projects, including pedestrian and bicycle facilities, recreational trails and Safe Routes to School projects.
	Highway Safety Improvement Program (HSIP)	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program	Helps fund projects that reduce fatalities and serious injuries on all public roads.
	Congestion Mitigation and Air Quality Improvement Grant (CMAQ)	https://www.fhwa.dot.gov/fastac t/factsheets/cmaqfs.cfm	Federal initiative that supports a range of projects aimed at reducing transportation-related air emissions in air quality nonattainment areas.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Federal funds distributed by the FAST act via formula to Caltrans • Eligible Receivers of Funds: Allocated to the State of California based on population and distributed by Caltrans through the competitive Active Transportation Program (ATP) • Amount of Funding Available: $850M (FY 2019), $850M (FY 2020)	• Design • Construction
• Program Guidelines: https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/lapg/g09.pdf • Funding Type: Federal funds from the FAST Act, distributed by Caltrans through a competive grant process • Application Form: http://www.dot.ca.gov/hq/LocalPrograms/HSIP/2018/Apr/HSIPCycle9ApplicationForm.pdf (Cycle 9, 2018) • Other Key Requirements: The program is data-driven and requires records such as crash experience (data that has already been collected to identify intersections with potential for improved safety), crash potential (further refined data to identify locations with high-risk roadway characteristics), and crash rates. Minimum 10% local match required, unless all improvements proposed satisfy safety countermeasures mentioned in Section 4-2 of the Local Roadway Safety Plan. • Eligible Applicants: Cities, counties and tribal governments. • Projects Funded: Infrastructure upgrades, safety solutions for roadways (including signalization improvements) and Safe Routes to School infrastructure projects • Eligible Project Costs: Environmental Analysis, PS & E (Plans, Specifications, and Estimates), Right-of-Way Acquisition, Design, Construction • Frequency of Funding Cycles: Biennial, last call for projects (Cycle 9) occurred on Apr - Aug 2018 • Amount of Funding Available: $182M (Cycle 9, 2018), $216.9 M (Cycle 8, 2016) • Min/Max Funding Request: Min: $100k Max: $10M • # of Applications Received: 351 (Cycle 9), 247 (Cycle 8) • % and # of Applicants Awarded: 63% (221 Awards) - Cycle 9, 91% (225 Awards) - Cycle 8 • Average Amount Awarded: $824,000 (Cycle 9), $964,000 (Cycle 8) • Key Contacts: Tifini Tran, (657) 328-6275, Tifini.Tran@dot.ca.gov	• Data Collection and Analysis • Design • Construction
• Funding Type: Federal funds from the FAST Act, allocated to regional/county transportation commissions based on population. • Eligible Receivers of Funds: The Orange County Transportation Authority (OCTA) received an annual amount of approximately $50 million for Orange County projects. OCTA reserves 90% of CMAQ funds for transit and high occupancy vehicle lane projects and distributes the remaining 10% ($5 million) through its Bicycle Corridor Improvement Program (BCIP). Cities apply directly to OCTA for CMAQ funds through the BCIP program (see p.136-137). • Projects Funded: Infrastructure projects that can demonstrate a reduction in greenhouse gas emissions (GHG) and vehicle miles traveled (VMT). • Frequency of Funding Cycles: Annual • Amount of Funding Available: $5M annually	• Data Collection and Analysis • Design • Construction

	Funding Source	Program Website	Program Purpose
FEDERAL	Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant	https://www.transportation.gov/BUILDgrants	Formerly known as Transportation Investment Generating Economic Recovery (TIGER) grants, BUILD grants are administered by the U.S. Department of Transportation. The grant program is highly competitive and supports projects that are considered innovative, including multi-modal and multi-jurisdictional proposals. The program is authorized through FY20.
	Land and Water Conservation Fund (LWCF)	http://www.parks.a.gov/?page_id=21360	Originally established in 1964 by President Lyndon B. Johnson, the annual LWCF program provides federal support for the acquisition and development of outdoor recreation space.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Competitive grant application • Eligible Applicants: State, local, tribal governments, transit agencies, port authorities, MPOs, political subdivisions of State or local governments • Projects Funded: Large scale multi-modal and multi-jurisdictional transportation infrastructure projects, including upgrades of existing infrastructure and higher-priced bicycle and pedestrian facilities. • Other Key Requirements: Before initiating the application process through http://www.grants.gov, all applicants must first obtain a Data Universal Numbering System (DUNS) number; register with the System for Award Management (SAM); create a Grants.gov username and password; and register at least one Authorized Organization Representative (AOR) to serve as the point of contact. • Frequency of Funding Cycles: Annual • Amount of Funding Available: $1.5B (FY 19) / similar funding for FY20 • Min/Max Funding Request: Min: $5M Max: $25M • Average # of Applications Received: 585 (FY 18) • % and # of Applicants Awarded: 7% (41 awards, FY 18) • Average Amount Awarded: $12M (FY 18) • Key Contacts: Howard Hill, (202) 366-0301, BUILDgrants@dot.gov	• Design • Construction
• Funding Type: Competitive grant application. Although the National Parks Service (NPS) administers the program nationwide, local agencies submit their proposals directly to California Department of Parks and Recreation (CDPR). CDPR is responsible for selecting the most competitive • California applications and sends them to the NPS for final review and approval. • Eligible Applicants: Cities, counties, tribal governments, joint power authorities, non-state agencies with authority over public parks • Projects Funded: Local projects that create new recreation space, expand existing recreation space, and/or develop recreation features. Funding may be also used to establish recreational/active transportation trail corridors that connect significant community locations, such as neighborhoods, workplaces, and schools. • Other Key Requirements: Minimum 50% match is required. • Disadvantaged Community Requirements: Yes • Frequency of Funding Cycles: Annual • Amount of Funding Available: $94.9M (national total FY 16), $8.8M to California applications in FY 16 • Min/Max Funding Request: Min: $250k Max: $750k • # of Applications Received: 24 in California • # of Applicants Awarded: 17 California applications • Average Amount Awarded: $518k to California applications (FY 2016) • Key Contacts: Melinda Steinert, (916) 651-7744, Melinda.Steinert@parks.ca.gov	• Acquisition • Design • Construction

	Funding Source	Program Website	Program Purpose
FEDERAL	Recreational Trails Program	http://www.parks.a.gov/?page_id=24324	FHWA offers local jurisdictions funding for active transportation infrastructure, focusing primarily on multi-use trails in open space areas.
	The Transportation Infrastructure Finance and Innovation Act (TIFIA)	https://www.transportation.gov/buildamerica/programs-services/tifia	Provides credit assistance for qualified large-scale surface transporation projects of regional and national significance, including pedestrian and bicycle infrastructure networks. The TIFIA credit program is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Competitive grant application. The Federal Highway Administration (FHWA) distributes federal Surface Transportation Block Grant • Program funds to state parks departments evenly based on a prescribed formula. Grant is administered in California by CDPR. • Eligible Applicants: Cities, counties, state and federal agencies, non-profit organizations with management and responsibilities of public lands • Projects Funded: Funding is primarily awarded to projects that establish or maintain recreational trails in parks (county, state, federal), although trail connector corridors along roadways are also eligible if they link two sections of previously disconnected recreational trail. Land acquisition for trails is also supported as part of project funds. • Other Key Requirements: Minimum 12% match is required. • Frequency of Funding Cycles: Biennial • Amount of Funding Available: Approximately $10M (FY 15-16) • Max Funding Request: 88% of total project cost (12% local match is required) • Average # of Applications Received: 64 in California (FY 15-16) • % and # of Applicants Awarded: 15.5% (10 awards in California) • Average Amount Awarded: $1M (FY 15-16) • Key Contacts: Melinda Steinert, (916) 651-7744, Melinda.Steinert@parks.ca.gov	• Acquisition • Design • Construction
• Funding Type: Secured (direct) loan, loan guarantee, standby line of credit • Eligible Applicants (Project Sponsors): State governments, State infrastructure banks, private firms, special authorities, local governments, transportation improvement districts • Projects Funded: Highways and bridges, intelligent transportation systems, intermodal connectors, transit-oriented development, bicycle and pedestrian facilities, rural infrastructure projects • Eligible Project Costs: Reconstruction, rehabilitation, acquisition of property (including land related to the project and improvements to the land), environmental mitigation, construction contingencies, equipment acquisition, and operational improvements directly related to system performance • Local Match: The applicant is expected to cover around 51 to 66 percent of project costs, as the amount of Federal credit assistance may not exceed 33 percent of total reasonably anticipated eligible project costs (under special circumstances, credit assistance may account for up to 49 percent of costs). USDOT uses a multi-step application process for TIFIA credit assistance, as described in https://www.transportation.gov/buildamerica/programs-services/tifia/applications • Frequency of Funding Cycles: USDOT conducts a rolling application process where project sponsors may submit Letters of Interest at any time and USDOT will permit project sponsors to apply once a favorable eligibility determination is made. • Min. Funding Request: $10 million for Transit-Oriented Development, Local, and Rural Projects; $15 million for Intelligent Transportation System Projects; $50 million for all other eligible Surface Transportation Projects • # of Projects Funded: 77 projects and $31B in loan assistance nationwide since 1999 • Key Contacts: BureauCredit@dot.gov	• Acquisition • Design • Construction

	Funding Source	Program Website	Program Purpose
FEDERAL	Metropolitan and Statewide Planning and NonMetropolitan Transportation Planning (FTA Sections 5303, 5304 and 5305 funds)	https://www.transit.dot.gov/funding/grants/metropolitan-statewide-planning-and-nonmetropolitan-transportation-planning-5303-5304	Provides funding and procedural requirements for multimodal transportation planning in metropolitan areas and states. Planning needs to be cooperative, continuous, and comprehensive, resulting in long-range plans and short-range programs reflecting transportation investment priorities.
	Enhanced Mobility of Seniors & Individuals with Disabilities (FTA Section 5310 funds)	https://www.octa.net/Projects-and-Programs/Funding-Programs/Federal-Funding/FTA-Funding/	The FTA Section 5310 Formula Grants makes federal funds available to enhance mobility for seniors and persons with disabilities by providing funds for programs to serve the special needs of transit-dependent populations beyond traditional public transportation services and ADA complementary paratransit services.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Formula • Eligible Receivers of Funds: State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs). Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. • Projects Funded: Funds are available for a range of planning activities, including those that increase the safety and security of the transportation system for motorized and nonmotorized users; protect and enhance the environment, promote energy conservation, improve the quality of life; enhance the integration and connectivity of the transportation system, across and between modes; and emphasize the preservation of the existing transportation system.	• Planning
• Funding Type: Funds are given by formula from FTA to state or local government agencies that operate a public transportation service (local entities). The local entities in charge of distributing funds can then determine how to distribute funds for subrecipient projects, which can either be distributed via formula, competitive or discretionary process. • Eligible Applicants: Local agencies, state government agencies, nonprofit organizations, and operators of public transportation. • Projects Funded: 55 percent of funds must be spent on capital infrastructure (e.g., buses and vans, wheelchair lifts, transportation services) while 45 percent of funds can be spent on “”nontraditional”” projects such as improving signage, ride sharing programs, signal enhancements, and building an accessible path to a bus stop. • Amount of Funding Available: $277M (FY 2018 - nationwide), $2M (FY 2018 - Orange County) • Min/Max Funding Request: $50,000 minimum, $3M maximum • Key Contacts: (916) 653-2812, bondsandgrants@resources.ca.gov “	

		Funding Source	Program Website	Program Purpose
STATE	The Road Repair and Accountability Act of 2017 (SB 1)	Caltrans Active Transportation Program	Caltrans website: http://www.dot.ca.gov/hq/LocalPrograms/atp/index.html California Transportation Commission website: http://www.catc.ca.gov/programs/atp/	A leading source of funding for bicycle, pedestrian and Safe Routes to School projects in the State of California, the ATP program was created in 2013 and consolidated existing federal and state transportation programs. Under SB 1, the ATP has been expanded to provide an additional $100M to cities, counties and regional transportation agencies for bike lanes, pedestrian paths, sidewalks, safe routes to schools, and other projects that help reduce reliance on cars. The additional funding represents an 83 percent increase to the ATP program after adoption of SB 1

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.catc.ca.gov/programs/atp/2019/docs/051618_2019_ATP_Guidelines_Final_Adopted.pdf (Cycle 4) • Funding Type: Competitive grant application • Application Forms: As of Cycle 4 (2018), the ATP program has five different applications depending on project type. This includes Large • Infrastructure ($7M or greater), Medium Infrastructure ($1.5M or greater to under $7M), Small Infrastructure (Less than $1.5M), Non- • Infrastructure (Safe Routes to School projects, plans, programs or combination of), and Plans (Disadvantaged Communities only). Applications can be accessed through Caltrans at http://www.dot.ca.gov/hq/LocalPrograms/atp/cycle-4.html • Eligible Applicants: Cities, counties and transit agencies • Projects Funded: Bicycle and pedestrian infrastructure projects, safety solutions, Safe Routes to School programs, infrastructure and plans, Active Transportation Plans for disadvantaged communities • Eligible Project Costs: Environmental Analysis, PS & E (Plans, Specifications, and Estimates), Right-of-Way Acquisition, Design, Construction • Disadvantaged Community Requirements: Yes. Applicants can use of one of the following three formulas to determine whether or not a project is within a disadvantaged community: (1) top 25 percent of CalEnviroScreen 3.0 Census Tracts, (2) Median Incomes that are lower than 80% of statewide average, or (3) 75 percent of students in project area that qualify for free/reduced lunches. • Other Key Requirements: Does not require a local match, but applicants with a local match may receive up to 5 points out of 100 points on grant applications for medium or large infrastructure projects. • Frequency of Funding Cycles: Biennial, last call for projects (Cycle 4) occurred on May 16 - July 31, 2018. Cycle 5 is expected to occur in Spring 2020. • Amount of Funding Available: $440M (Cycle 4, 2018), $350M (Cycle 3, 2016), $359M (Cycle 2, 2015), $368M (Cycle 1, 2014) • Min/Max Funding Request: Min: $250k (for infrastructure projects) Max: None • # of Applications Received: 554 (Cycle 4, 2018), 456 (Cycle 3, 2016), 617 (Cycle 2, 2015), 771 (Cycle 1, 2014) • % and # of Applicants Awarded: 38% (174 Awards) - Cycle 3, 34% (207 Awards) - Cycle 2, 34% (265 Awards) - Cycle 1 • Average Amount Awarded: Approximately $2M (Cycle 3), $1.7M (Cycle 2), $1.4M (Cycle 1) • Key Contacts, Caltrans: Teresa McWilliam, (916) 653-0328, teresa.mcwilliam@dot.ca.gov • Key Contacts, CTC: Laurie Waters, (916) 651-6145, Laurie.Waters@catc.ca.gov	• Planning • Programs • Design • Construction

		Funding Source	Program Website	Program Purpose
STATE	The Road Repair and Accountability Act of 2017 (SB 1)	Local Partnership Program (LPP)	http://www.catc.ca.gov/programs/sb1/lpp/	LPP supplements voter-approved transportation tax investments made by local communities by providing matching funds. The California Transportation Commission (CTC) intends for this program to balance the priority of directing increased revenues to areas of the state with the highest level of transportation need while maintaining fair distribution of grant funds statewide.
		State Transportation Improvement Plan (STIP)	http://www.dot.ca.gov/hq/LocalPrograms/STIP.htm	A multi-year capital improvement program for transportation projects on and off the State Highway System funded by revenues from the Transportation Investment Fund and other federal sources.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.catc.ca.gov/programs/sb1/lpp/docs/062719+Amended_LPP%20Guidelines.pdf (2018) • Funding Type: 50% of funds are released through a competitive grant application process, 50% of funds are released through a formula. For formula funded projects, the CTC will adopt the funding share for each eligible taxing authority by establishing northern and southern California shares and by attributing the proportional share of revenues from voter approved taxes, tolls, and fees and distributing in proportion based on the county's population. • Eligible Applicants: Cities, counties, and transit agencies with voter approved taxes, tolls and fees dedicated to transportation. • Projects Funded: Road maintenance, road rehabilitation and other transportation infrastructure improvements. • Disadvantaged Community Requirements: Yes (on competitive applications only) • Frequency of Funding Cycles: Annual (Formula), every two years (competitive) • Amount of Funding Available: $392.7M ($83.9M for Formula Grants, $308.8M for Competitive Grants in 2018). $200M of LPP funds come from the SB 1 Program • Min/Max Funding Request: Varies based on population • Average # of Applications Received: 90 in competitive program (2018), 33 in formulaic program • % and # of Applicants Awarded: 30% (27 awards in competitive program) • Average Amount Awarded: $11.4M (competitive program, 2018), $2.5M (formulaic program, 2018) • Key Contacts: Christine Gordon, (916) 654-2940, Christine.Gordon@catc.ca.gov	• Design • Construction
• Program Guidelines: http://www.dot.ca.gov/hq/LocalPrograms/STIP/2018/2018_CTC_STIP_Guidelines.pdf (2017) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties and transit agencies • Projects Funded: Transportation infrastructure projects, including bicycle and pedestrian projects, on and off of the State Highway system. • Other Key Requirements: Local agencies should work through their Regional Transportation Planning Agency (RTPA), County Transportation Commission, or Metropolitan Planning Organization (MPO), as appropriate, to nominate projects for inclusion in the STIP. Bicycle and pedestrian projects may be programmed by a region in its Regional Transportation Improvement Plans (RTIP) as these projects are eligible for either State Highway Account or Federal funds. • Frequency of Funding Cycles: Biennial • Amount of Funding Available: $569M (Statewide), $6.96M (Orange County) • Min/Max Funding Request: None • Average Amount Awarded: $3.5M • Key Contacts: Leah Shepard, (916) 651-6881, leah.shepard@dot.ca.gov, Sudha Kodali, (916) 651-6879, sudha.kodali@dot.ca.gov	• Planning • Design • Construction

		Funding Source	Program Website	Program Purpose
STATE	The Road Repair and Accountability Act of 2017 (SB 1)	State Highway Operation and Protection Program (SHOPP)	https://catc.ca.gov/programs/state-highway-operation-and-protection-program	SHOPP is the State's "fix-it-first" funding mechanism for the rehabilitation and reconstruction of all state highways and bridges. SHOPP also provides the opportunities to address other vital State priorities, such as the reduction of transportation related greenhouse gas (GHG) emissions and implementation of Complete Streets elements like pedestrian and bicycle facilities.
		Local Streets and Roads Program (LSRP)	https://catc.ca.gov/programs/sb1/local-streets-roads-program	SB 1 dedicates approximately $1.5 billion per year in new formula revenues to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: https://catc.ca.gov/-/media/ctc-media/documents/programs/shopp/20190626_adopted_shopp_guidelines_a11y.pdf • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies • Projects Funded: Rehabilitation and reconstruction of all state highways and bridges, including Interstate highways; the supporting infrastructure for those facilities such as culverts, traffic operations systems, safety roadside rest areas, and maintenance stations; and most importantly, to address safety and emergency repair needs. Streets and Highways Code Section 2030 (b)(1)(D) states that complete street components, including active transportation purposes, pedestrian and bicycle safety projects, and multi-modal transit facilities are SHOPP-eligible in conjunction with any other allowable project. • Frequency of Funding Cycles: Biennial • Amount of Funding Available: $11B (2018) • Min/Max Funding Request: None • % and # of Applicants Awarded: 1003 awards (2018) • Average Amount Awarded: $13M • Key Contacts: Teri Anderson , Assistant Chief Engineer – California Transportation Commission, (916) 653-0218, Teri.Anderson@catc.ca.gov	• Design • Construction
• Program Guidelines: https://catc.ca.gov/-/media/ctc-media/documents/081518-lsrp-reporting-guidelines-adpoted-a11y.pdf • Funding Type: Formula • Eligible Receivers of Funds: Cities and counties must submit a list of proposed projects to the California Transportation Commission (CTC) and a project expenditure report at the end of the year detailing the description, location, amount of funds expended, and estimated useful life of improvements constructed with program funding. • Eligible Applicants: Cities, counties and transit agencies. • Projects Funded: Road maintenance and rehabilitation; safety projects; Complete Streets Components (including active transportation projects, pedestrian and bicycle safety projects, and multi-modal transit facilities in conjunction with any other allowable project); and Traffic Control Devices. • Frequency of Funding Cycles: Annual • Amount of Funding Available: $1.5B/year • Average Amount Awarded: $356,000 (County projects) $43,000 (City projects) • Key Contacts: Alicia Sequeira Smith, Assistant Deputy Director – California Transportation Commission, (916) 651-6143, Alicia.Sequeira@catc.ca.gov	• Design • Construction

		Funding Source	Program Website	Program Purpose
STATE	The Road Repair and Accountability Act of 2017 (SB 1)	Solutions for Congested Corridors Program (SCCP)	https://catc.ca.gov/programs/sb1/solutions-for-congested-corridors-program	Provides funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state. Initiated in 2017 through the passage of SB 1, the program offers $250 million annually for projects that implement specific transportation performance improvements and are part of a comprehensive corridor plan, such as providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: https://catc.ca.gov/-/media/ctc-media/documents/sb1-sccp-final-adopted-guidelines-and-resolution-120617-a11y.pdf) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies • Projects Funded: Improvements to state highways, local streets and roads, rail facilities, public transit facilities, and bicycle and pedestrian facilities. Preference will be given to corridor plans that demonstrate collaboration between Caltrans and local or regional partners, reflecting a comprehensive planning approach. • Frequency of Funding Cycles: Every two years • Amount of Funding Available: $250M/year • Min/Max Funding Request: None • Average # of Applications Received: 32 (FY 2018) • % and # of Applicants Awarded: 28% (9 awards, FY 2018) • Average Amount Awarded: $27M (FY 2018) • Key Contacts: Teresa Favila, Associate Deputy Director – California Transportation Commission, (916) 653-2064, teresa.favila@catc.ca.gov	• Design • Construction

		Funding Source	Program Website	Program Purpose
STATE	The Road Repair and Accountability Act of 2017 (SB 1)	Adaptation Planning Grant	http://www.dot.ca.gov/hq/tpp/grants.html	Allocates funds to local and regional agencies for climate change planning and related improvements. This funding is intended to advance adaptation planning on California's transportation infrastructure, including but not limited to roads, railways, bikeways, trails, bridges, ports, and airports. Note that funding may be provided by another source outside of SB-1 in the future.
	Non-SB 1	Office of Traffic Safety Grants (OTS)	https://www.ots.ca.gov/grants/pedestrian-and-bicycle-safety/	The California Office of Traffic Safety (OTS) administers federal grant funds allocated to California under the National Highway Safety Act. The OTS has several priority areas for grant funding, including Pedestrian and Bicycle Safety.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.dot.ca.gov/hq/tpp/grant_files/FY_19-20/07_Final_5OCT18_APGrantGuideFY2019-20.pdf (FY 2019-2020) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies, local and regional agencies, special districts • Disadvantaged Community Requirement: Yes • Projects Funded: Plans that advance adaptation planning on California's transportation infrastructure, including but not limited to roads, railways, bikeways, trails, bridges, ports, and airports • Other Key Requirements: 11.47% match is required, which may be in cash or through an in-kind contribution • Frequency of Funding Cycles: Annual • Amount of Funding Available: $7M (FY 2019) $6M (FY 2020) • Min/Max Funding Request: Min: $100k Max: $1M • Average # of Applications Received: 26 (FY 2019), 30 (FY 2018) • % and # of Applicants Awarded: 85% (22 awards, FY 2019), 70% (21 awards, FY 2018) • Average Amount Awarded: $323K (FY 2019), $333k (FY 2018) • Key Contacts: Priscilla Martinez-Velez, (916) 651-8196, priscilla.martinez-velez@dot.ca.gov	• Planning
• Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies • Projects Funded: OTS has several priority areas for grant funding, including Pedestrian and Bicycle Safety. OTS supports a wide variety of traffic safety programs, including pedestrian and bicycle safety programs for children, child passenger safety outreach, and support for increased law enforcement services and resources, such as safety helmet distribution, and court diversion programs for safety helmet violators. • Key Contacts: Bao Her, (916) 509-3013, bao.her@ots.ca.gov or Jim Owens, (916) 509-3014, jim.owens@ots.ca.gov	• Planning

		Funding Source	Program Website	Program Purpose
STATE	Miscellaneous State Funding Sources (non-SB 1)	Environmental Enhancement and Mitigation (EEM) Grant Program	http://resources.ca.gov/grants/environmental-enhancement-and-mitigation-eem/	The EEM Grant Program is a State fund established by the Legislature to fund beautification improvements to roadsides to mitigate the effects of transportation projects. It offers funding to local, state, and federal governmental agencies and to nonprofit organizations for projects to mitigate the environmental impacts caused by new or modified public transportation facilities.
		Proposition 68 Greening Infrastructure Grant Program	http://resources.ca.gov/grants/green-infrastructure/	Proposition 68 authorized the Legislature to appropriate $18.5 million to the California Natural Resources Agency for competitive grants for multibenefit green infrastructure investments in or benefiting disadvantaged or severely disadvantaged communities.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://resources.ca.gov/grants/wp-content/uploads/2018/04/Final-Guidelines-1.pdf (2018) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies • Projects Funded: Projects must be directly or indirectly related to the environmental impact of the modification of an existing transportation facility or construction of a new transportation facility. • Other Key Requirements: Up to 25 percent in local match funding is usually required for each grant application submitted. Grants are awarded in the categories of highway landscaping and urban forestry, resource lands, roadside recreation, and mitigation projects. • Frequency of Funding Cycles: Annual • Amount of Funding Available: $7M/year • Min/Max Funding Request: Min: None Max: $500k ($1M for projects that include acquisition) • # of Applications Received: 44 (FY 2016) • % and # of Applicants Awarded: 34% (15 awards, FY 2016) • Average Amount Awarded: $467k (FY 2016) • Key Contacts: Carol Carter, (916) 651-7588, Carol.Carter@Resources.ca.gov or Cristelle Erickson, (916) 651-7593, Cristelle.Erickson@Resources.ca.gov	• Design • Construction
• Program Guidelines: http://resources.ca.gov/grants/wp-content/uploads/2019/05/Final-Guidelines-1.pdf (2019) • Funding Type: Competitive grant application • Eligible Applicants: Local agencies, nonprofit organizations, non-governmental land conservation organizations • Disadvantaged Community Requirement: All projects must be located within or benefit a disadvantaged or severely disadvantaged community. • Projects Funded: Stormwater projects that incorporate permeable surfaces, green streets and alleyways, recreational trails, and non-motorized roadways that connect residents to schools, parks and employment centers. • Other Key Considerations: While not directly tied to initial rankings, additional factors for project selection include feasibility for an applicant to provide partial funding to the project to leverage grant funds. • Amount of Funding Available: $18.5M (FY 2019) • Min/Max Funding Request: $50,000 minimum, $3M maximum • Key Contacts: (916) 653-2812, urbangreening@resources.ca.gov “	• Acquisition • Design • Construction”

		Funding Source	Program Website	Program Purpose
STATE	Miscellaneous State Funding Sources (non-SB 1)	Affordable Housing and Sustainable Communities Program (AHSC)	http://www.sgc.ca.gov/programs/ahsc/resources/	The AHSC Program is a joint effort by the Strategic Growth Council and California Department of Housing and Community Development. The Program assists affordable housing developments, sustainable transportation infrastructure, transportation-related amenities, and multi-modal transit promotion.
		Systemic Safety Analysis Report Program (SSARP)	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program/local-roadway-safety-plans	Provides local agencies with funding assistance to perform collision analyses, identify roadway safety issues, and develop cost-effective collision countermeasures. SSARP exchanges federal Highway Safety Improvement Program (HSIP) funds for State Highway Account (SHA) funds, simplifying the application process and improving participation by agencies that are less familiar with federal requirements.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.sgc.ca.gov/programs/ahsc/docs/20181031-AHSC_17-18_FINAL_Guidelines.pdf (2018) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies, developers • Disadvantaged Community Requirement: Yes • Projects Funded: Transportation projects (including active transportation) must be located within one-half mile of a qualifying transit stop/station. Exceptions may be granted if the project is identified in an adopted plan. (general/specific or bike/pedestrian). • Frequency of Funding Cycles: Annual • Amount of Funding Available: $255M (FY 2018) • Min/Max Funding Request: Min: $1M Max: $20M • # of Applications Received: 131 (FY 2017) • % and # of Applicants Awarded: 19% (25 awards, FY 2017) • Average Amount Awarded: $11.8M (FY 2017) • Key Contacts: (916) 263-2771, ahsc@hcd.ca.gov	• Programs • Design • Construction
• Program Guidelines: https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/hsip/2018/ssarpguidelines2016feb.pdf • Funding Type: Competitive grant application • Eligible Applicants: Cities and counties • Projects Funded: Roadway safety analyses, plans that develop countermeasures to increase safety and reduce collision rates. • Other Key Requirements: Minimum 10% local match is required. • Frequency of Funding Cycles: Upon receipt of available funding • Amount of Funding Available: $17.7M • Min/Max Funding Request: Min: None Max: $250k • Average # of Applications Received: 108 (FY 2016) • % and # of Applicants Awarded: 99% (107 awards, FY 2016) • Average Amount Awarded: $165k (FY 2016) • Key Contacts: Tifini Tran, (657) 328-6275, Tifini.Tran@dot.ca.gov	• Data Collection and Analysis • Planning

		Funding Source	Program Website	Program Purpose
STATE	Miscellaneous State Funding Sources (non-SB 1)	Urban and Community Forestry Program	http://calfire.ca.gov/resource_mgt/resource_mgt_urbanforestry_grants	Provides grant funding for projects that result in a net reduction of greenhouse gases through reforestation efforts.
		Mobile Source Air Pollution Reduction Review Committee (MSRC)	http://www.cleantransportationfunding.org/	The program awards funding to projects that deliver clean vehicles to school districts and funds transit agencies to obtain alternative fuel buses. MSRC also accepts grant applications for a variety of complete street projects, including goods movement and first/last mile solutions. The program provides funding to projects that help commuters reduce the number of miles they drive, including purchase incentives for electric-assist bicycles, bike racks on buses, and bicycles for law enforcement patrols.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://calfire.ca.gov/Grants/downloads/UrbanForestry/UCF%20P%2068%202018-19_GRANT%20GUIDELINES%2010-10-2018_FINAL.PDF (2018) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies, non-profit organizations • Disadvantaged Community Requirement: Yes • Projects Funded: Program provides grant funding for projects that result in a net reduction of greenhouse gases through reforestation efforts. Although the program is not geared towards transportation, former awardees utilized funds to enhance pedestrian, bicycle, and transit amenities. • Other Key Requirements: The program features a two-part selection process: (1) initial concept proposals are submitted and scored; and (2) high-scoring proposals are invited to submit a complete application package. In addition, all applicants are required to provide a minimum 25% match. • Frequency of Funding Cycles: At-will, upon receipt of available funding. • Amount of Funding Available: $17.1M (2018) $19.5M (2016-2017) • # of Applicants Awarded: 32 (2016-2017) • Average Amount Awarded: $527k (2016-2017)	• Design • Construction
• Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies, and school districts • Projects Funded: The program provides funding to projects that help commuters reduce the number of miles they drive, including purchase incentives for electric-assist bicycles, bike racks on buses, and bicycles for law enforcement patrols. In 2015, program funding was divided into four categories: (1) Local Government Match Program – $13,000,000, (2) Alternative Fuel Infrastructure Program - $5,000,000, (3) Major Event Center Transportation Program - $4,500,000, (4) Transportation Control Measure County Transportation Commission Partnership Program - $10,000,000. • Frequency of Funding Cycles: At-will, upon receipt of available funding • Key Contacts: Cynthia Ravenstein, (909) 396-3269, cynthia@cleantransportationfunding.org	• Programs • Design • Construction

		Funding Source	Program Website	Program Purpose
STATE	Miscellaneous State Funding Sources (non-SB 1)	Transportation Development Act (TDA)	http://www.dot.ca.gov/hq/MassTrans/State-TDA.html	TDA funds a wide variety of transportation programs, including planning and program activities, pedestrian and bicycle facilities, community transit services, public transportation, and bus and rail projects.
		California Endowment Grants/PRIs/DCA/ SPGs	http://www.calendow.org/funding-opportunities/	The California Endowment's grantmaking is guided by their Building Healthy Communities (BHC) effort, awarding single- and multi-year grants and Direct Charitable Activity (DCA) contracts.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.dot.ca.gov/hq/MassTrans/Docs-Pdfs/STIP/TDA_4-17-2013.pdf • Funding Type: Formula. The Transportation Development Act (TDA) provides two sources of funding for the improvement of existing public transportation services: The Local Transportation Fund (LTF) and the State Transit Assistance fund (STA). The LTF fund is derived from a 1/4-cent general sales tax and the STA fund is derived from sales tax on diesel fuel. Some counties can use LTF funds for local streets and roads projects if all transit needs are met. STA funds may not be used to fund administration, streets, or roads projects. The funding may be allocated to transit- and non-transit related projects that comply with regional transportation plans. These funds are allocated to areas of each county based on population, taxable sales and transit performance. • Eligible Applicants: Transportation planning authorities, county transportation commissions, cities, counties, MPOs, JPAs, and transit agencies • Projects Funded: Planning and program activities, pedestrian and bicycle facilities, community transit services, public transportation, and bus and rail projects. Specifically, two percent of the remaining funds shall be made available to counties and cities for pedestrian and bicycle facilities unless the transportation planning agency finds that the funds could be better used to meet other applicable transportation planning purposes in accordance with TDA provisions. • Frequency of Funding Cycles: Annual • Amount of Funding Available: In fiscal year 2018-2019, OCTA is expected to receive $170.9 million in TDA revenue. • Key Contacts: Joshua Pulverman, (916) 657-3863i	• Planning • Programs • Design • Construction
• Funding Type: The California Endowment does not accept unsolicited letters of intent or proposals. Funding opportunities are by invitation only. • Eligible Applicants: Funding is provided to nonprofit organizations that are not classified as private foundations, California state and local government entities, and faith-based organizations that welcome and serve all members of the community.	

		Funding Source	Program Website	Program Purpose
STATE	Miscellaneous State Funding Sources (non-SB 1)	Caltrans Sustainable Transportation Planning Grant Program	https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants	The Sustainable Transportation Planning Grant Program includes two programs - (1) Sustainable Communities, to encourage local and regional planning that furthers state goals, including the Regional Transportation Plan Guidelines adopted by the California Transportation Commission. (2) Strategic Partnerships, to identify and address statewide, interregional, or regional transportation deficiencies on the State highway system in partnership with Caltrans.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.localassistanceblog.com/wp-content/uploads/2019/08/Final-FY-20-21_STP-Grant-Guide-1.pdf • Funding Type: Competitive grant application, formula grants • Eligible Applicants: MPOs, cities, counties, transit agencies (competitive grants), MPOs (formula grants) • Disadvantaged Community Requirement: Yes • Projects Funded: Bicycle, pedestrian and multi-modal plans, may also fund plans that combine land use and housing needs alongside multi-modal transportation solutions (Sustainable Communities), while the Strategic Partnership grant funds planning projects that address needs on the State highway system, including a transit component that specifically addresses multimodal deficiencies. • Other Key Requirements: Sustainable Communities and Strategic Partnerships Transit Component - 11.47% local match is required, which may be in cash or through an in-kind contribution, minimum 20% local match of non-federal cash funds or an in-kind contribution for all other Strategic Partnership Grants • Frequency of Funding Cycles: Annual • Amount of Funding Available: Sustainable Communities - $17M (Competitive Grants, FY 2019), $12.5M (Formula Grants, FY 2019), Strategic Partnerships - $1.5M, $3M (Transit Component) • Min/Max Funding Request: Min: $100k Max: $500K (Competitive Grants only) • Average # of Applications Received (Competitive only): Sustainable Communities - 138 (FY 2019), 127 (FY 2018), Strategic Partnerships - 16 (FY 2019) • % and # of Applicants Awarded (Competitive only): Sustainable Communities - 47% (65 awards, FY 2019), 34% (43 awards, FY 2018), Strategic Partnerships - 75% (12 awards, FY 2019) • Average Amount Awarded (Competitive only): Sustainable Communities - $286k (FY 2019), $288k (FY 2018), Strategic Partnerships - $264k (FY 2019) • Key Contacts: Marlon Regisford - (657) 328-6288 (Phone), Email: marlon.regisford@dot.ca.gov and Cole Iwamasa - (657) 328-6540 (Phone), Email: cole.iwamasa@dot.ca.gov	• Planning

	Funding Source	Program Website	Program Purpose
REGIONAL	Sustainability Planning Grant Program	http://sustain.scag.ca.gov/Pages/Grants%20and%20Local%20Assistance/GrantsLocalAssistance.aspx	As a key source in funding active transportation and multi-modal plans in Orange County and Southern California, SCAG provides funding for projects that promote and implement regional sustainable community strategies through planning and policy.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://sustain.scag.ca.gov/Documents/Sustainable%20Communities%20Program%20Guidelines.pdf (2018) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, transit agencies • Disadvantaged Community Requirement: Yes (depends on application category) • Projects Funded: Project funding is broken down into three categories: Integrated Land Use; Active Transportation; and Green Region. Cities, counties, and transportation authorities are eligible to compete for funding through all three mechanisms, increasing the amount of total funding available for ATP projects throughout the county. While chiefly funding plans, this funding source also provides active transportation outreach programs through SCAG's "Go Human" campiagn and funding for quick-build demonstration projects displaying best practices in bicycle and pedestrian infrastructure. • Other Key Requirements: Does not require a local match, but applicants with a local match may receive between 5-10 points out of 100 points an grant applications (depending on the application category) • Frequency of Funding Cycles: Annual • Amount of Funding Available: $6M (2018) • Max Funding Request: $250k (Plans), $500k (Quick-Build Demonstration Projects) • # of Applications Received: 139 (FY 2017) • % and # of Applicants Awarded: 39% (54 awards, FY 2017) • Average Amount Awarded: $178k (FY 2017) • Key Contacts: Rye Baerg, baerg@scag.ca.gov	• Planning • Programs • Construction (Quick-Build Demonstration Projects Only)

	Funding Source	Program Website	Program Purpose
REGIONAL	Air Pollution Control Projects that Reduce/Mitigate Emissions/Toxic Exposure	http://www.aqmd.gov/nav/grants-bids	On a semi-regular basis, the South Coast Air Quality Management District (SCAQMD) releases a Request for Proposals (RFP) for projects that reduce emissions in the SCAQMD monitoring area.
	RMC Grant Program	http://www.rmc.ca.gov/grants/intro.html	The San Gabriel and Lower Los Angeles Rivers and Mountain Conservancy (RMC) awards approximately $30 million each year to projects that protect open space, preserve or restore natural habitat, and encourage low-impact uses. RMC's jurisdiction includes eastern Los Angeles County and western Orange County. There are a total of 68 cities within the RMC jurisdiction.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Competitive grant application • Eligible Applicants: Public agencies, universities, consultants, businesses located within SCAQMD • Projects Funded: The RFP places no restrictions on project type, process, or methodology. The only requirement is that the proposed project results in a real reduction of emissions or develops a technology that aids in compliance with air quality standards. • Frequency of Funding Cycles: At-will, upon receipt of available funding • Amount of Funding Available: Multiple funds contributed to the $61 million available for the 2018 application cycle, although some sources were restricted to certain target areas. Active transportation projects that reduce congestion and promote walking and biking were eligible for roughly half of all available funding. • Key Contacts: Michael Krause, (909) 396-2706, mkrause@aqmd.gov	• Design • Construction
• Program Guidelines: http://www.rmc.ca.gov/Prop1/FINAL_RMCGrantGuidelines_Sept2018_09172018.pdf (2018) • Funding Type: Competitive grant application • Eligible Applicants: Cities, counties, JPAs, non-profit organizations located within RMC jurisdictional boundaries • Disadvantaged Community Requirement: Yes • Projects Funded: Evaluation criteria focuses heavily on land and resource conservation, but points are also awarded for projects that support low-impact trail uses such as walking and bicycling. • Other Key Requirements: The following cities are eligible for RMC funding in Orange County: Anaheim, Brea, Buena Park, Cypress, Fullerton, La Habra, La Palma, Los Alamitos, Placentia, and Seal Beach. While matching funds are not required, special consideration will be given to projects which identify substantive matching funds for otherwise competitive project proposals. • Frequency of Funding Cycles: At-will, upon receipt of available funding. Application cycles typically occur during the latter half of the year, but RMC may release additional calls for projects if funds are available. • Key Contacts: Mark Stanley, (626) 815-1019 x100, mstanley@rmc.ca.gov	• Planning (limited funds available) • Design • Construction

		Funding Source	Program Website	Program Purpose
LOCAL	Public Funds	Local Fair Share Program (Project Q)	http://www.octa.net/Projects-and-Programs/All-Projects/Streets-Projects/Overview/	Under the OC Go initiative, the Local Fair Share Program provides municipalities in Orange County with funding for street improvement projects. To receive funding, cities must agree to adhere to several criteria related to fund management, including but not limited to: accounting, eligible expenditures, and reporting protocols. Funding is distributed by the Orange County Transportation Authority (OCTA).
		Measure M2 (OC Go) Regional Capacity Program (Project O)	https://www.octa.net/Projects-and-Programs/Plans-and-Studies/Funding-Programs/Call-for-Projects/CTFP-Calls-for-Projects/Regional-Capacity-Program/	Under the OC Go initiative, the Regional Capacity Program serves to incorporate improvements to roadways designated in the Master Plan of Arterial Highways (MPAH). Funding is distributed by the Orange County Transportation Authority (OCTA).

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Funding is distributed by the Orange County Transportation Authority (OCTA) according to a formula that considers population, total street mileage, and gross sales tax collected. This formula favors larger cities; however, distribution of funds are proportional to the factors mentioned above. • Eligible Applicants: All cities in the Orange County and the County of Orange • Projects Funded: Examples of funded projects include transit expansion, active transportation infrastructure, and environmental mitigation efforts. • Frequency of Funding Cycles: Annual • Amount of Funding Available: $51M (FY 2016) • Average Amount Awarded: $1.5M (FY 2016) • Key Contacts: Joe Alcock, jalcock@octa.net	• Design • Construction
• Funding Type: As a competitive grant program, Project O is organized into three project categories: The ACE improvement category complements freeway improvement initiatives underway and supplements development mitigation opportunities on arterials throughout the MPAH. The ICE improvement category provides funding for operational and capacity improvements at intersecting MPAH roadways. The FAST improvement category focuses on street to freeway interchanges and includes added emphasis upon arterial transitions to interchanges. • Eligible Applicants: Local agencie • Projects Funded: A range of roadway infrastructure projects, including rehabilitation and/or resurfacing of existing pavement, installation of pedestian signals, and additional right-of-way to accommodate significant pedestrian volumes or bikeways shown on a Master Plan of Bikeways or in conjunction with a “Complete Streets” effort. • Other Key Requirements: A 50 percent local match is required with potential to reduce this amount if certain eligibility requirements are met. A Council Resolution or Minute Order action authorizing request for funding consideration with a commitment of local match funding must be provided with the project application. • Frequency of Funding Cycles: Annually or on an as-needed basis • Amount of Funding Available: $32M for 2020 Call for Projects, $1.1B available over the 30-year M2 program • Min./Max. Funding Request: Category 1 projects are limited to those projects requesting $5 million or less. Category 2 projects are defined as those requesting more than $5 million in Measure M2 funds. • Key Contacts: Alfonso Hernandez, (714) 560-5363, ahernandez@octa.net”	• Planning • Environmental Analysis • Acquisition • Design • Construction

		Funding Source	Program Website	Program Purpose
LOCAL	Public Funds	Bicycle Corridor Improvement Program (BCIP)	http://www.octa.net/Projects-and-Programs/Plans-and-Studies/Funding-Programs/Call-for-Projects/BCIP-Call-For-Projects/	The Orange County Transportation Authority (OCTA) issues a call for transportation-related projects that promote walking and biking, increase regional connectivity, and improve air quality throughout the County. BCIP funding is made possible by the federal Congestion Mitigation and Air Quality Improvement Program (CMAQ).
	Private Funds	Fostering Healthy Environments	https://www.calwellness.org/money/apply-grant/	Funded by the California Wellness Foundation (Cal Wellness), Fostering Healthy Environments grants are available to nonprofit organizations and public organizations interested in promoting environmental justice, equitable access to healthy food, and park equity for low-income communities.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: http://www.octa.net/pdf/2019BCIPGuidelines.pdf?n=20180926 (2018 – Covers FY 2019-2020 through FY 2023-2024) • Funding Type: Competitive grant application • Eligible Applicants: Public agencies in Orange County, non-profit organizations • Projects Funded: Projects include new bicycle or multi-use facilities; bicycle boulevards and sharrows; bicycle racks, lockers, and parking; bicycle crossing infrastructure; bicycle facility improvements; and pedestrian improvements in conjunction with bicycle facilities, as well as environmental analysis for such projects. • Other Key Requirements: Project applications are limited to either environmental or implementation phases. Projects with both environmental phases and implementation phases will not be considered for funding. A minimum 12% local cash match is required for all projects, of which federal transportation dollars will not be eligible. • Frequency of Funding Cycles: Biennial • Amount of Funding Available: $25M (2019), distributed into two categories: $2M (Environmental), $23M (Implementation) • Min/Max Funding Request: Min: $100k Max: $500K (Environmental), Min: $200K Max: $4M (Implementation) • # of Applications Received: 27 (2016) • % and # of Applicants Awarded: 48% (13 awards, 2016) • Average Amount Awarded: $1.5M (2016) • Key Contacts: Louis Zhao, (714) 560-5494	• Environmental Analysis • Acquisition • Design • Construction
• Funding Type: Competitive grant application • Eligible Applicants: Non-profit public organizations and religious organizations • Disadvantaged Community Requirement: Yes • Projects Funded: Previous grants have been awarded to projects that promote public outreach and participation in land use planning and policymaking processes, increase the availability of healthy food in disadvantaged neighborhoods, and provide training and technical assistance to communities and local governments to increase park access. Available grant information does not explicitly reference active transportation; however, a strong argument could be made that bike/pedestrian projects increase connectivity to healthy foods and parks. • Frequency of Funding Cycles: Although Cal Wellness issues RFP's at-will when funding is available, most grants are awarded through a solicitation process. Cal Wellness is moving to a new grants management system in early 2019 focusing on a simpler, more streamlined communications between Cal Wellness and its grantees and grant applicants. • Amount of Funding Available: $950M (since 1992) • # of Applicants Awarded: 8390 awards since 1992 • Average Amount Awarded: $113k • Key Contacts: Cal Wellness Grants Management, (818) 702-1900	• Planning • Programs

		Funding Source	Program Website	Program Purpose
LOCAL	Private Funds	Community Health Initiatives	https://community.kp.org/be-involved/funding-opportunities	Kaiser Permanente offers a variety of grant opportunities to non-profit organizations and government agencies. The Community Health Initiatives program provides funding to community-based projects that promote healthy lifestyles and disease prevention including chronic diseases such as obesity.
		Pacific Life Foundation Grants	http://www.pacificlife.com/foundation/overview.html	Over the past 32 years, the Pacific Life Foundation has provided funding to support a wide range of social and environmental issues. Primary funding categories include “Health and Human Services” and “Civic, Community, and Environment” focus areas.
		Partnership for the Care of our Environment	https://www.oc-cf.org/grants-scholarships-overview/grants/available-grants/	Each year, the Orange County Community Foundation makes grant funding available to support environmental education programs and conservation/preservation efforts.

Applicant/Project Suitability	Eligible Project Types
• Funding Type: Competitive grant application • Eligible Applicants: Public agencies, non-profit organizations • Disadvantaged Community Requirement: Yes • Projects Funded: Active transportation projects could qualify for grant funding under several different focus areas, including but not limited to: policy and environmental change, smart growth/land use, multi-sector collaboration, parks and recreation, school wellness, worksite wellness, and health promotion and prevention. • Frequency of Funding Cycles: At-will, based on available funding • Amount of Funding Available: $600k (FY 2017) • Min/Max Funding Request: While funds are focused on smaller plans and programs, grants may be awarded in excess of $25,000. • # of Applicants Awarded: 36 awards (FY 2017) • Average Amount Awarded: $16.7k (FY 2017)	• Planning • Programs
• Funding Type: Competitive grant application • Eligible Applicants: Public agencies, non-profit organizations • Disadvantaged Community Requirement: Yes (depends on application category) • Projects Funded: In previous application cycles, “Health and Human Services” grants have been awarded to projects and programs that improve the quality of life and health of individuals in disadvantaged communities. “Civic, Community, and Environment” grants are available for projects that protect and preserve the natural environment, as well as young adult programs that promote leadership, civic responsibility, and diversity. • Frequency of Funding Cycles: At-will based on available funding • Amount of Funding Available: $102M (Over 32-year life of program), Approximately $7M (FY 2018) • Min/Max Funding Request: Min: $5K Max: $25k (General projects), Min: $20K Max: $100k (Capital projects) • Average # of Applications Received: Approximately 400 (FY 2018) • % and # of Applicants Awarded: 56% (224 awards, FY 2018) • Average Amount Awarded: $10k (FY 2018), with some larger awards • Key Contacts: (949) 219-3214, PLFoundation@PacificLife.com	• Planning • Programs • Construction
• Funding Type: Competitive grant application • Projects Funded: Eligible projects include hands-on education programs that coordinate with school curriculums, programs that promote sustainability and natural resource preservation, the creation or support of open space (parks, trails, etc.), and the development/implementation of sustainability-oriented programs. • Frequency of Funding Cycles: Annual • Amount of Funding Available: $100k/year • Key Contacts: Austin Muckenthaler, amuckenthaler@oc-cf.org	• Programs

		Funding Source	Program Website	Program Purpose
LOCAL	Non-Profit	Community Benefit Grants Program	https://www.hoag.org/about-hoag/community-benefit/hoag-programs/grants-program/	Hoag Health Network sponsors the Community Benefit Grants Program on a semi-regular basis, offering Orange County nonprofit organizations, government agencies, and educational institutions the opportunity to compete for health-related grant funding.

Applicant/Project Suitability	Eligible Project Types
• Program Guidelines: https://www.hoag.org/documents/Community-Benefit/Hoag-Community-Benefit-Grants-Program-RFP-2019.pdf • Funding Type: Competitive grant application • Eligible Applicants: Public agencies, non-profit organizations • Disadvantaged Community Requirement: Yes • Projects Funded: Hoag identifies “Economic Security: Housing, Homelessness, Transportation”, “Mental Health”, “Access to Care”, “Prevention and Management of Chronic Disease (Includes Overweight and Obesity)”, as priority focus areas, opening the door for active transportation projects to qualify under multiple criteria. Successful applications will incorporate interagency partnerships and collaboration efforts, especially as they pertain to addressing critical needs. • Other Key Requirements: Attendance at a grant application workshop is required prior to submittal of the Community Benefit Grants Program application. • Frequency of Funding Cycles: At-will, based on available funding. • Max Funding Request: $50k • Key Contacts: CommunityBenefitGrants@hoag.org	• Programs

6.3 Implementation Plan & Reporting

The purpose of this section is to identify the actions recommended for effective implementation of OC Active. OCTA should maintain a proactive role in advancing and encouraging implementation of active transportation improvements identified in this plan. These efforts would build on recent OCTA actions, including the preparation of the four Supervisorial Bikeways Strategies, supporting the advancement of the OC Loop project, and preparation of OC Active. While responsibility for implementation of most active transportation projects lies with local jurisdictions, OCTA is uniquely positioned to provide assistance with planning and programming efforts, pursuit of funding, and coordination between jurisdictions. These roles are important to ensure advancement of the projects identified in OC Active, particularly for those projects that make regional active transportation connections between jurisdictions.

The community outreach effort conducted as part of OC Active provided valuable insights into the interests of the public, local jurisdictions, and committees within OCTA. The outreach process instituted during the OC Active Plan confirms that OCTA should take a proactive role in the implementation of active transportation infrastructure and programs in Orange County upon completion of OC Active. The following plan identifies where OCTA can be actively involved to ensure implementation of the OC Active Plan through internal actions, as well as continue support for active transportation projects with local agencies and constituents through a variety of external coordination strategies.

Overall, implementation is a collaborative process and requires partnerships between OCTA and local/regional stakeholders, with recommended steps outlined below.

1. Improve Regional Pedestrian and Bicycle Infrastructure

a. Provide funding through OCTA-managed funding sources
b. Support local jurisdictions seeking funding through grant assistance workshops
c. Encourage local jurisdictions to adopt active transportation policies, programs and infrastructure in their planning documents consistent with the OC Active Plan

2. External Coordination

a. OCTA active transportation coordinator to conduct events/workshops so stakeholders can collaborate on advancing active transportation policies, programs and infrastructure in Orange County
b. Make the OC Active Plan available for adoption by municipalities
c. Facilitate coordination between stakeholders to advance OC Active Plan policies, programs and infrastructure projects
d. Encourage local jurisdictions to coordinate planning efforts with the OC Active Plan
e. Encourage each jurisdiction to designate a mobility coordinator to interact directly with the OCTA mobility coordinator to implement projects in the OC Active Plan
f. Update and work with stakeholders on issues relating to active transportation countywide

g. Provide technical support to local jurisdictions
h. Participate in technical advisory committees and working groups organized by local jurisdictions
i. Connect local jurisdictions to other local organizations and expert sources to support implementation of active transportation projects, policies and programs
j. Publicize outcomes of active transportation infrastructure, educational, and demonstration projects
k. Continue to enhance education and training for bicyclists, pedestrians, bus operators, and others to improve awareness and safer interactions for all roadway users
l. Continue annual active transportation campaigns, such as advertising/messaging, bike and walk to work/school, radio advertisements, social media, and other related activities

3. Internal Coordination

a. Maintain and update OCTA's active transportation webpage and other applicable websites, newsletters, social media profiles, and online resources to provide relevant information to stakeholders regarding resources, funding, key information, and best-practices on walking, bicycling, and other forms of active transportation
b. Research upcoming grant opportunities and innovative finance strategies and identify how local jurisdictions can achieve implementation
c. Ensure the needs for active transportation projects are considered in the development of all transportation projects and programs within OCTA
d. Plan and participate in events that promote bicycling and walking, such as Bike-to-Work Week and Open Streets
e. Provide bicycle/pedestrian outreach and support by organizing workshops/forums to disperse information related to active transportation
f. Communicate with OCTA committees as necessary
g. Conduct before and after performance evaluations of projects led by OCTA or projects funded through OCTA's grant programs
h. Explore opportunities to add additional bicycle accommodations on buses and trains
i. Expand bicycle parking and provide other bicycle facilities at OCTA stops and transit hubs
j. Review and consider updates to the OC Active Plan every five years (at a minimum)
k. Monitor the use of bicycle facilities to measure the effectiveness of their location and design, and to help gauge where additional infrastructure/facilities are needed

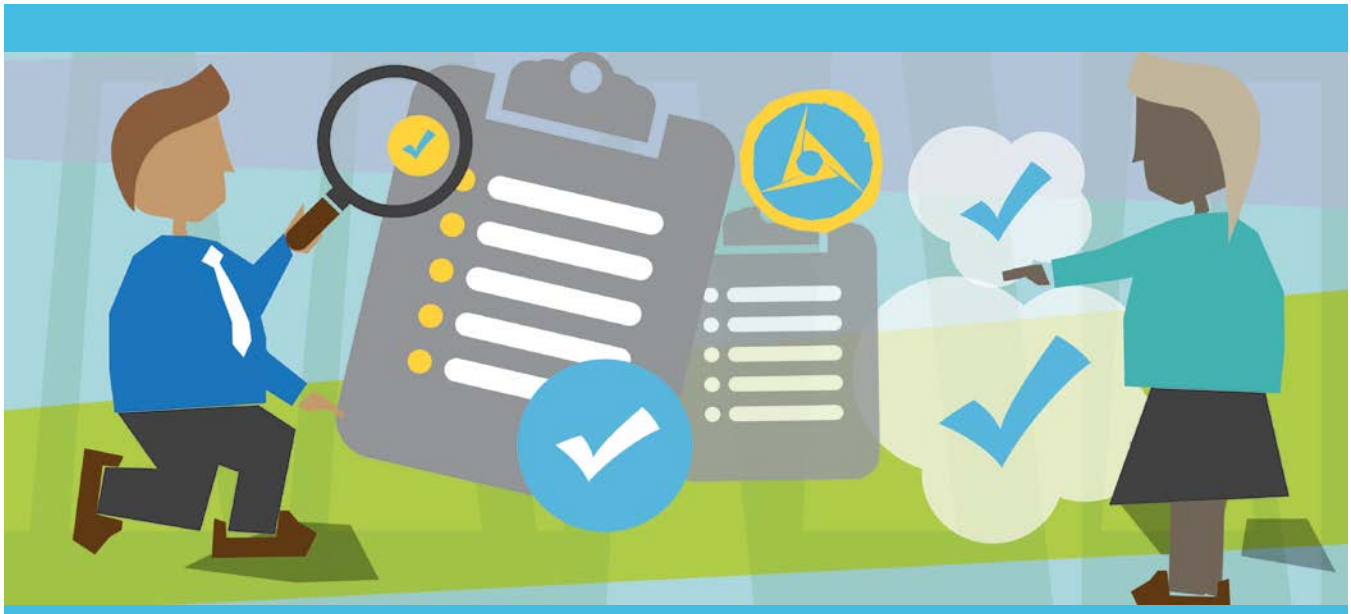
4. Address Regional Priorities

a. Lead future focused studies of the regional bikeway corridors identified in OC Active – Central County Loop, South County Loop, and Central County Connector
b. Lead the implementation efforts of projects within OCTA owned rights-of-way
c. Review development plans and environmental documents and provide comments, 1) to ensure that

developers and local jurisdictions are complying with the OC Active Plan, and 2) to encourage these entities to add local supplemental facilities and infrastructure that may not be on the OC Active Plan but could enhance the overall connectivity of the bicycle/pedestrian network

d. Advise local jurisdictions to submit projects that address the regional priorities when state or federal funds become available

e. Provide incentives to local jurisdictions for submitting projects that address the regional priorities during calls-for-projects for funds controlled by OCTA



A APPENDIX

A.1 Community Outreach Summary Report

OC Active

Outreach Report

November 2018

Prepared for:

Prepared by:

Table of Contents

1 Executive Summary

Overview

Over the past several years Orange County Transportation Authority (OCTA) has prioritized the development of active transportation facilities throughout the County. Active transportation creates opportunities for people to exercise, promotes healthy, happy lifestyles, and fosters local economy by providing sustainable transportation options and creating dynamic, connected communities.

To meet this objective, OCTA launched OC Active—Orange County's Bike and Pedestrian Plan, a project that aimed to recognize the areas and opportunities of improvement for active transportation countywide. This 18-month project began in March of 2017 with an established set of goals, as noted below:

- Advance Strategic Walking and Biking Network
- Enhance Walking and Biking Access to Transit
- Improve High-Need Pedestrian Areas
- Reduce Pedestrian and Bicyclist Collisions
- Strengthen Stakeholder Partnerships
- Incorporate Diverse Community Perspectives
- Leverage Funding Opportunities

Community Engagement

Consistent with state requirements and project goals, a robust program of public engagement was developed to solicit community input and promote the project efforts by OCTA. Public engagement occurred between February 2017 and October 2018. Feedback was solicited on active transportation needs and priorities to help inform the analysis. The project team reached out to Orange County residents through numerous outreach events and surveys as described below:

- Completed two online public surveys related to walking and biking, resulting in over 1,500 responses,
- Hosted project website and social media presence,
- Attended 76 community events and festivals for survey input and promotion,
- Developed the Chalk, Walk & Roll Contest where elementary, middle, and high school could win a donated skateboard or bicycle rack through artwork submission,
- Partnered with the Orange County Healthcare Agency to facilitate the Walk to School Day participation by five local elementary schools on October 10, 2018, and
- Partnered with the Anaheim Police Department for the “Cruise with a Cop” community safety event at Maxwell Park in the city of Anaheim on March 24, 2018.

As a result of this engagement, the public shared significant input to inform the development of the Plan. At our various public engagement activities, we learned that there was strong interest and support for providing enhancements to encourage bicycle and walking activities throughout the county. Many participants were interested in learning when they could expect improvements and enhancements in their community. A number of participants expressed the desire to see improvements soon as a means to addressing safety concerns within their communities. The following emerging themes were conveyed during public engagement:

- Interest in better connections to parks, downtown areas, schools, jobs & retail centers, and transit.
- Preference for more and improved crosswalks, better nighttime lighting, and more shade/landscaping for people walking.
- Preference for separated bikeways and buffered bike lanes for people bicycling.
- Desire for educational campaigns addressing motorist, pedestrian, and bicyclist behaviors including safety concerns.
- Request for an online portal providing maps and information on bike facilities and biking events.

In addition to public engagement efforts, OCTA formed a Stakeholder Working Group (SWG) for agencies and community advocates to inform the OC Active project. The SWG consisted of representatives from local jurisdictions and advocacy organizations, the Orange County Council of Governments and the California Department of Transportation. Overall, two SWG meetings were held by OCTA, providing valuable input using the following guidelines:

- Provide technical and strategic recommendations during development of OC Active,
- Identify potential outreach activities to solicit input on the survey tool, and
- Promote OC Active to community members.

Additionally, the project team made multiple presentations to community members, the Orange County Council of Governments Technical Advisory Committee, OCTA's Technical Advisory Committee, and the OCTA Citizens Advisory Committee Bike and Pedestrian Subcommittee.

The public engagement efforts served to inform the technical team in the development of the OC Active plan. The engage tactics both educated the public on the need while soliciting useful feedback to help understand priorities and preferences. The consideration of the comments and input received as a result of the public engagement provided the opportunity to shape the OC Active plan in a way that reflects the desires and needs of Orange County communities.

2 Introduction

The Orange County Transportation Authority (OCTA) is preparing OC Active; a strategy to map out a better plan for walking, rolling, and bicycling. This is the first comprehensive countywide effort to identify transportation needs and opportunities for both walking and bicycling. The collaborative effort will incorporate detailed work already conducted by local cities and identify pedestrian and bicycle improvement access throughout Orange County (OC). The plan will help address pedestrian and bicyclist needs by supporting the development of more sustainable, livable, and efficient mobility in our communities. Once the plan is completed and adopted, it can help local cities secure funding to build a better network for people walking and rolling.

To solicit OC residents' feedback on their active transportation needs and priorities and to help inform the OC Active strategy, the project team reached out to OC residents through more than 70 outreach events and two online community surveys. Overall, the outreach efforts resulted in more than 1,500 completed surveys.

In addition to reaching out to residents, OCTA formed a Stakeholder Working Group (SWG) to provide a platform for agencies and key community members to discuss the OC Active plan and solicit feedback from SWG members. Overall, two SWG meetings were held by OCTA, providing valuable input to the project team.

This report provides a summary of all outreach activities and the community survey results.

3 Summary of Outreach Activities

2.1.1 OUTREACH EVENTS 2017

To promote the "OC Active" online survey (Typeform) between August 2017 and December 2017, the project team hosted seventy six (76) project booths at large community events throughout OC. The project team's attendance at events was promoted through the project Facebook page: https://www.facebook.com/OCActive. The project team also posted pictures of public interaction at events on the Facebook page. Overall, more than 100 Facebook posts were published by the project team to promote these events. At each event, the project team informed the public of the OC Active strategy and provided iPad kiosks for individuals to participate in the Typeform survey. At each booth, project factsheets and OC Bikeway Guides were available for visitors to take. The project team also displayed OCTA branded giveaways to attract more visitors to the booth and incentivize them to complete the survey. Please refer to Table 1 for a list of all the events attended.

Table 1 - OC Active Outreach Events in 2017

Event #	Day/ Date	Event	Location
#1	2/7	Orange County Council of Governments(OCCOG) Technical Advisory Committee(TAC)	Irvine
#2	3/13	Laguna Niguel Safety Night	Laguna Niguel
#3	3/13	OCTA Bicycle/Pedestrian Subcommittee	Orange
#4	4/1	Garden Grove Garden Grove Open Streets 3	Garden Grove
#5	4/19	Orange Coast College Green Faire	Costa Mesa
#6	4/19	Cal State University Fullerton, Institute of Transportation Engineers	Fullerton
#7	4/24	Alliance for A Healthy Orange County: Orange County Active Transportation Network	Santa Ana
#8	4/25	UCI WhimCycle	Irvine
#9	4/26	OCTA Technical Advisory Committee(TAC)	Orange
#10	4/30	Dana Point Grand Prix	Dana Point
#11	5/2	Orange County Council of Governments(OCCOG) Technical Advisory Committee(TAC)	Irvine
#12	5/4	OC Wheelmen	Irvine
#13	5/27	Brea Go Human	Brea
#14	6/2	OC Department of Education Parent Faire	Costa Mesa
#15	6/10	OC Parks Go Human	Anaheim
#16	6/20	OCTA Bicycle/Pedestrian Subcommittee	Orange
#17	6/27	OCTA Diverse Leaders	Orange
#18	7/6	OCTA RPH (Board 7/10)	Orange
#19	7/22	Magnolia Baptist Church	Anaheim
#20	7/28	Alliance for A Healthy Orange County Active Transportation Academy	Santa Ana
#21	8/24	Filipino American Chamber of Commerce of Orange County (FACCOC) Green & Health Expo	Garden Grove
#22	8/31-9/2	runDisney Expo	Anaheim
#23	9/9	Leisure World	Seal Beach
#24	9/12	Orange County Employees Association(OCEA) Health Fair & Farmers Market	Santa Ana
#25	9/16-9/17	Fiestas Patrias	Santa Ana
#26	9/19	OCTA Bicycle/Pedestrian Subcommittee	Orange

Event #	Day/ Date	Event	Location
#27	9/22	The Alliance for a Healthy Orange County(AHOC) Regional Active Transportation Forum	Santa Ana
#28	9/23	Irvine Global Village	Irvine
#29	9/26	OCTA Diverse Leaders	Orange
#30	9/27	OC Active SWG Meeting #1	Orange
#31	10/19	OCTA Teen Council	Orange
#32	10/21	Redefine Hazard Go Human	Garden Grove
#33	10/21	Downtown Santa Ana 5K	Santa Ana
#34	10/21	Hallow's Eve Bowl Jam	Laguna Niguel
#35	10/21	Anaheim PD Community BQ	Anaheim
#36	10/26	Downtown Anaheim Farmers Market	Anaheim
#37	10/28	Halloween Fun With Family and Friends	Stanton
#38	10/31	Rancho Santa Margarita Fall Family Festival	Rancho Santa Margarita
#39	11/4	Get Fit Festival	Irvine
#40	11/14	Metrolink Station - San Juan Capistrano	San Juan Capistrano
#41	11/16	Metrolink Station - Irvine	Irvine
#42	11/16	Metrolink Station - Anaheim	Anaheim
#43	11/16	Downtown Anaheim Farmers Market	Anaheim
#44	11/21	Metrolink Station - Fullerton	Fullerton
#45	11/26	Tamale Festival	La Habra
#46	11/29	Metrolink Station - Fullerton	Fullerton
#47	11/30	Metrolink Station - Tustin	Tustin
#48	12/2	Winter Market and Tree Lighting	Fullerton
#49	12/2	Winter Wonderland at the Plaza	Los Alamitos
#50	12/3	Tree Lighting Ceremony and Candlelight Choir Procession	Orange
#51	12/6	Tamale Festival & Las Posadas	Placentia
#52	12/6	Holiday Tree Lighting Ceremony	La Palma
#53	12/7	Metrolink Station - Irvine	Irvine
#54	12/7	Christmas Tree Lighting Ceremony Celebrating Holidays Around The World	Stanton
#55	12/11	Here Comes Santa Claus! (Taft Branch)	Orange
#56	12/12	OCTA Bicycle/Pedestrian Subcommittee	Orange

Event #	Day/ Date	Event	Location
#57	12/12	San Clemente Pier	San Clemente
#58	12/13	Here Comes Santa Claus! (Modena Branch)	Orange
#59	12/13	Newport Boat Parade	Newport Beach
#60	12/14	Fitness Hike at Little Sycamore	Laguna Beach
#61	12/16	Nutcracker Event at Susie Q. Community Center	Laguna Beach
#62	12/18	Newport Pier	Newport Beach
#63	12/20	Metrolink Station - Tustin	Tustin
#64	12/22	Metrolink Station - Fullerton	Fullerton
#65	12/28	San Clemente Outlets	San Clemente
#66	12/28	South Coast Plaza	Costa Mesa
#67	9/8	Dia de la Familia	Westminster
#68	9/15	Fiestas Patrias Festival	Santa Ana
#69	9/21	West Garden Grove Bike Rodeo	Garden Grove
#70	9/22	LRTP Community Event	Orange
#71	10/20	Walk Against Drugs	Mission Viejo

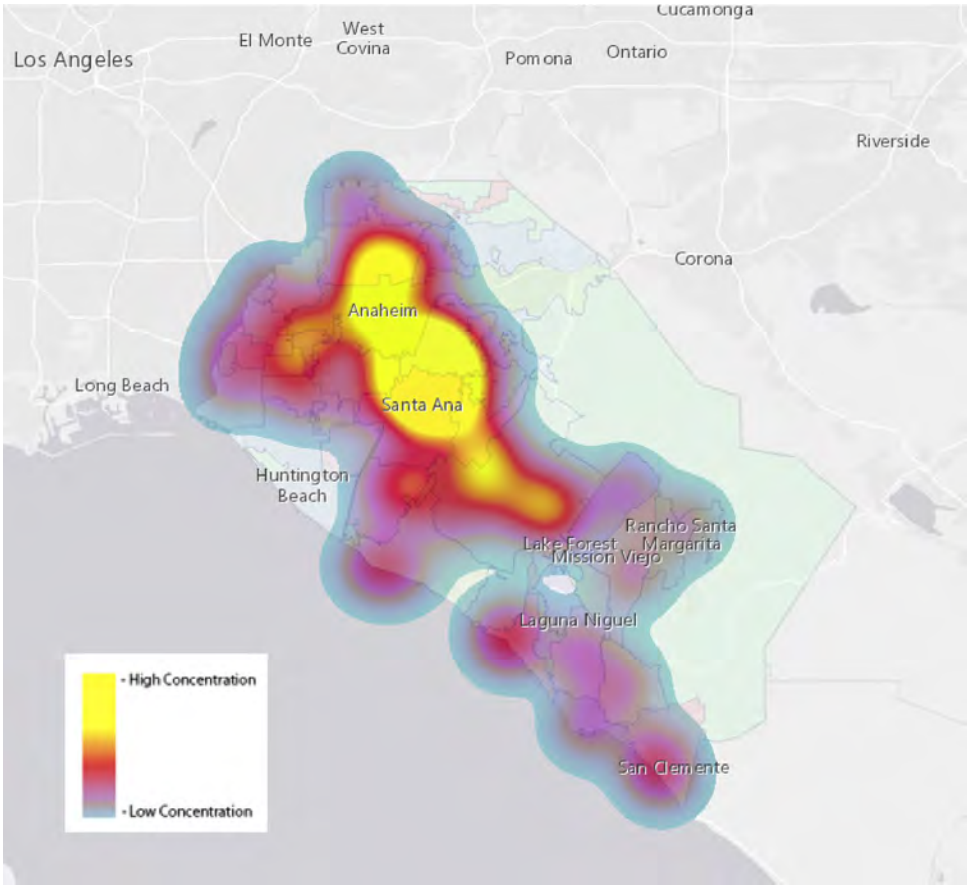
2.1.2 OUTREACH EVENTS 2018

To promote the "OC Active Rolling and Walking" online survey (Typeform) between September 2018 and October 2018, the project team hosted five (5) project booths at large community events throughout OC. At each event, the project team informed the public of the OC Active strategy and provided iPad kiosks for individuals to participate in the Typeform survey. At each booth, project factsheets and OC Bikeway Guides were available for visitors to take. The project team also displayed OCTA branded giveaways to attract more visitors to the booth and incentivize them to complete the survey. Please refer to Table 2 for a list of all the events attended and Figure 1 for a heat map of where the 2017 and 2018 events were concentrated.

Table 2 - OC Active Outreach Events in 2018

Event #	Day/ Date	Event	Location
#72	9/8	Dia de la Familia	Westminster
#73	9/15	Fiestas Patrias Festival	Santa Ana
#74	9/21	West Garden Grove Bike Rodeo	Garden Grove
#75	9/22	Long Range Transportation Plan Community Event	Orange
#76	10/20	Walk Against Drugs	Mission Viejo

Figure 1 - Heat Map of Events Concentration



2.2.1 COMMUNITY SURVEY 2017

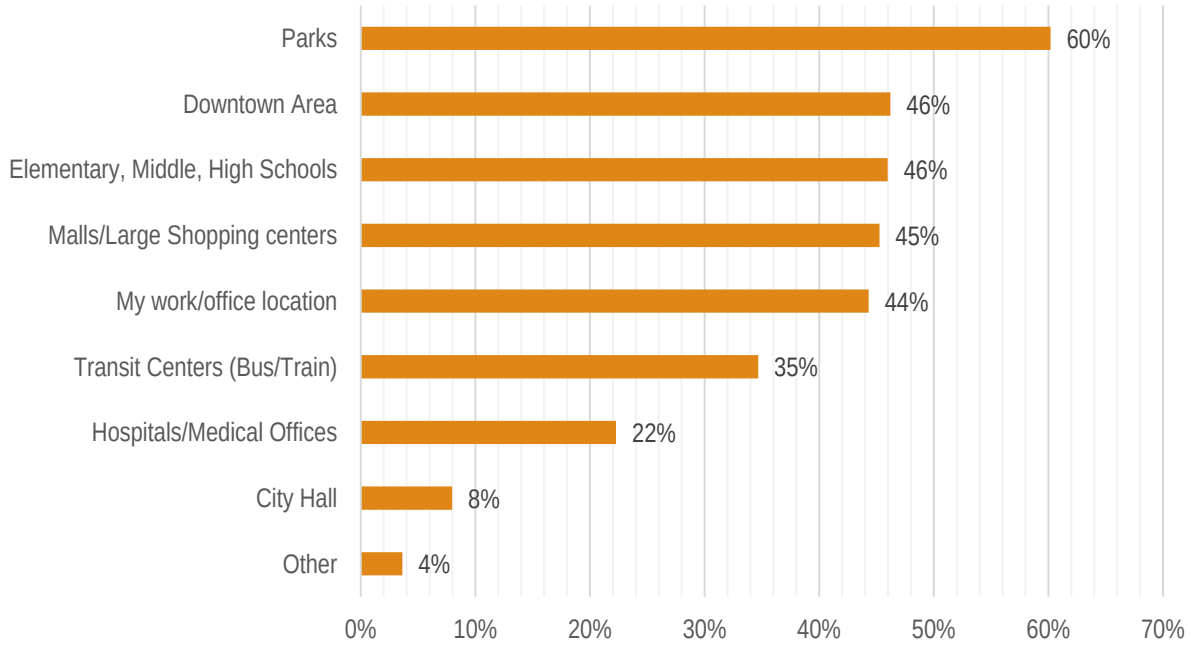
In May 2017, OCTA launched an online, interactive Typeform survey in order to better engage its stakeholders in jointly developing a comprehensive strategy to map out a better plan for walking, rolling, and bicycling throughout OC. The survey was promoted on the OC Active Facebook page and through OC Active booths at outreach events listed in Chapter 2.1.1. Over a span of approximately eight months, the project team collected more than 1,300 responses through the Typeform survey. The survey included questions on general and specific areas to be improved and transportation priorities for pedestrians and bicyclists. A total of 418 participants provided their email for further project updates. In addition, upon completion of the online survey, visitors were forwarded to an interactive map where they could pinpoint specific locations in OC and provide comments.

Please see below for a full breakdown of survey results. In addition, please refer to Appendix C to see the highlights of the survey results in an infographic format.

Question 1 – General Areas

The first survey question asked visitors to select up to four (4) general areas that they would like walking to be easier and more accommodating. Of the 1,266 people who answered this question, 60% put parks as a priority. Most respondents selected multiple areas they would like improved, as shown in Figure 2.

Figure 2 - General Areas Walking Can Be Improved



Question 2 – Specific Areas

The second question asked respondents to provide up to four (4) specific places where they would like walking to be easier and more attractive. A total of 742 people input locations. Table 3 lists the number

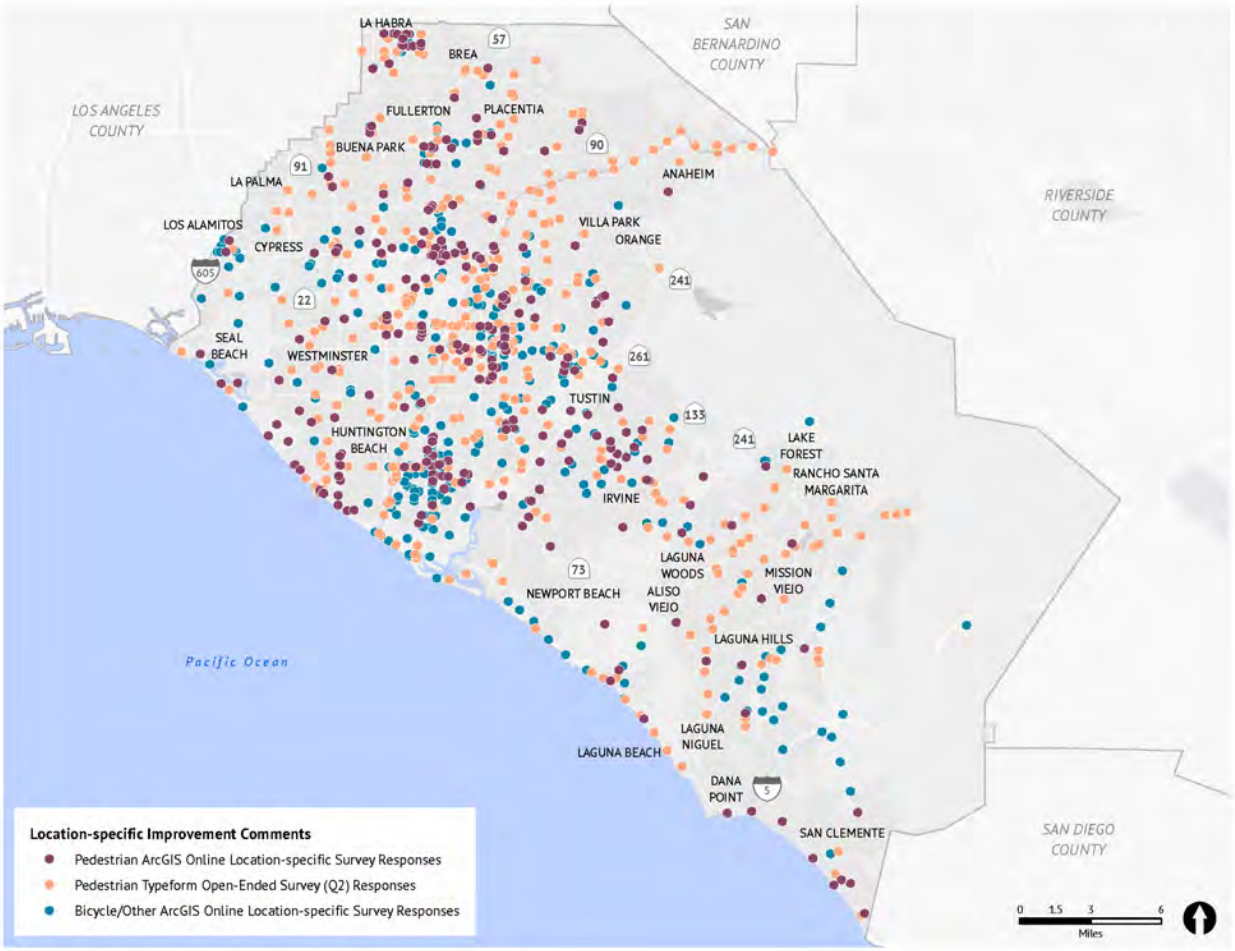
of times some of the key locations in OC were mentioned. Please refer to the survey results spreadsheet for the full list of respondents' answers.

Table 3 - Specific Areas Walking Can Be Improved

Anaheim Stadium	17	Irvine Business Center	5
Beaches	25	Katella Avenue	11
Beach Boulevard	19	Main Street	52
Disneyland	46	MainPlace Mall	6
Downtown Fullerton	6	Mile Square Park	6
Downtown Santa Ana	14	Santa Ana College	7
Fullerton College	6	Santa Ana River Trail	13
Golden West College	11	South Coast Plaza	10
Harbor Boulevard	28	The Block at Orange	10

Figure 2 shows a map of survey responses. This map was created based on respondents' answers to question 2 and the follow up ArcGIS Online survey.

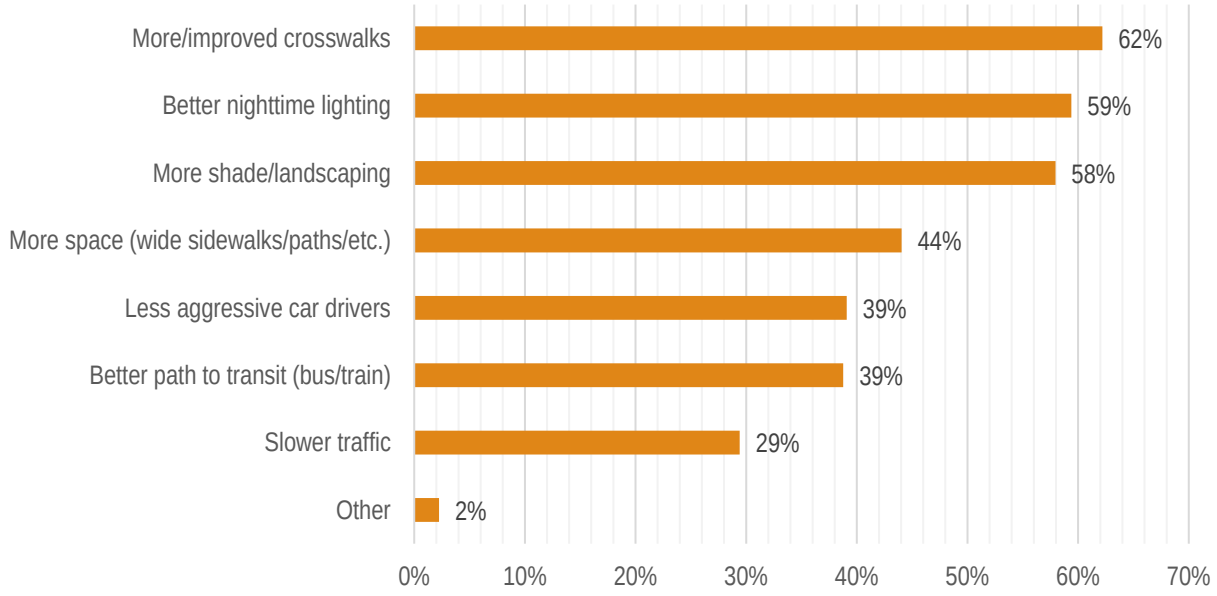
Figure 3 - Map of Survey Responses



Question 3 – Ways to Make Walking More Attractive

The third survey question asked participants to select up to four (4) things needed to make walking more attractive. Most respondents selected multiple areas they would like improved. Of the 1,251 people who answered this question, 62% chose More/improved crosswalks as a priority. This was closely followed by better nighttime lighting at 59% and more shade/landscaping at 58%. Figure 4 breaks down the results of question 3.

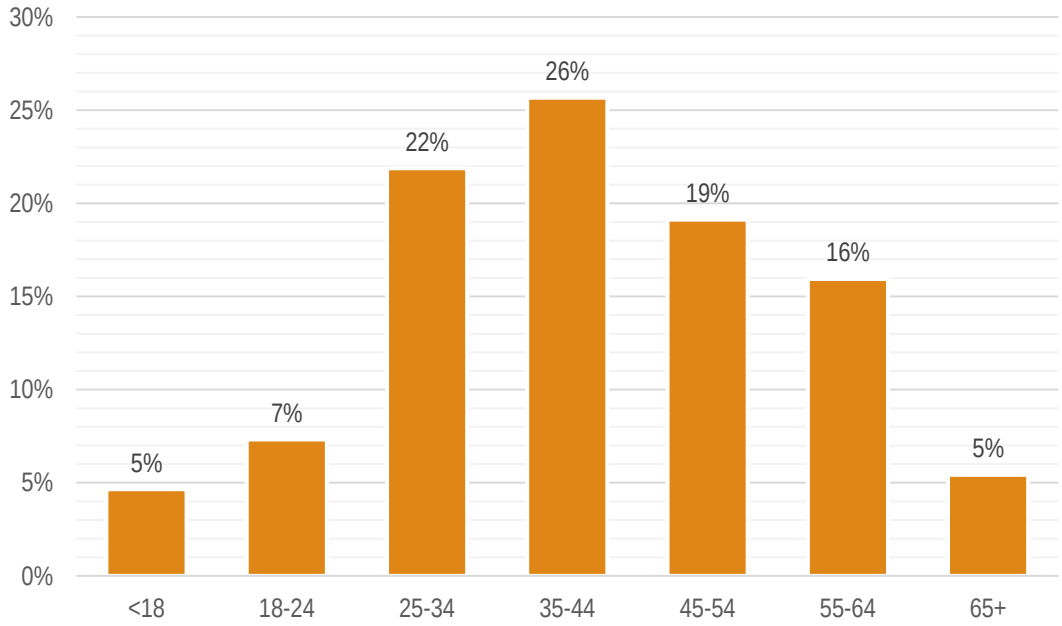
Figure 4 – Ways to Make Walking More Attractive



Question 4 – Age

The next few questions were optional questions regarding demographics. Question 4 asked participants to input their age. Results indicate that most respondents are in their mid-20s to mid-50s. Figure 5 breaks down the results for this question.

Figure 5 - Age of Respondents



Question 5 – Zip Codes

Question 5 asked participants to provide their home zip codes. 1,162 people answered this question. Table 4 lists some of the most common zip codes of survey participants. Figure 6 illustrates the amount of survey responses collected per OC area. Almost all areas of Orange County were covered in the survey, including all disadvantaged communities.

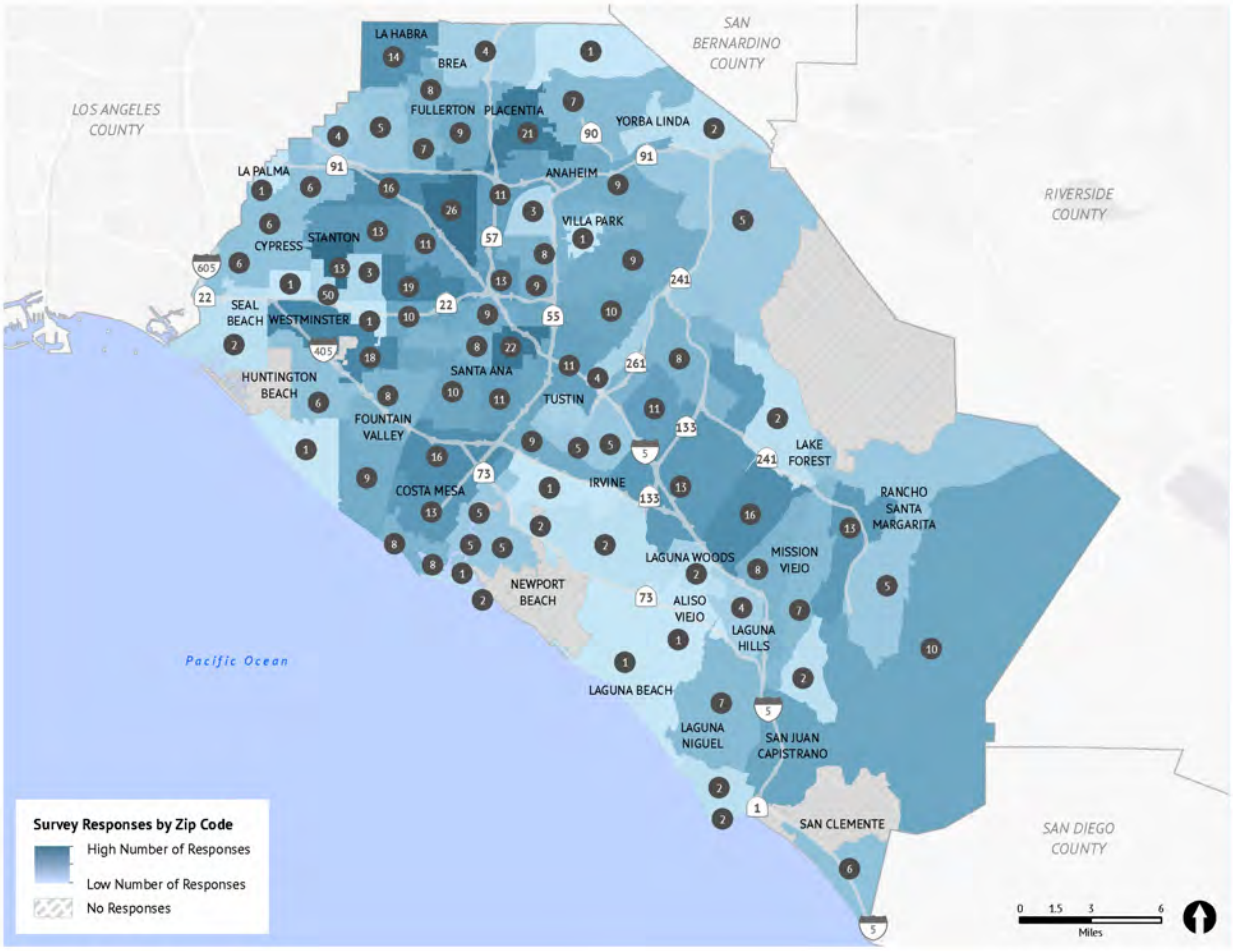
Table 4 – Significant Zip Codes of Respondents

Zip Code	Orange County Cities
90631	La Habra, Fullerton, La Habra Heights
90680	Stanton, Garden Grove
92630	Lake Forest
92683	Westminster, Seal Beach
92701	Santa Ana
92801	Anaheim, Fullerton
92805	Anaheim
92840	Garden Grove

Zip Code	Orange County Cities
92868	Orange, Santa Ana
92870	Placentia, Anaheim

Please refer to Figure 6 for a map of survey responses by zip codes.

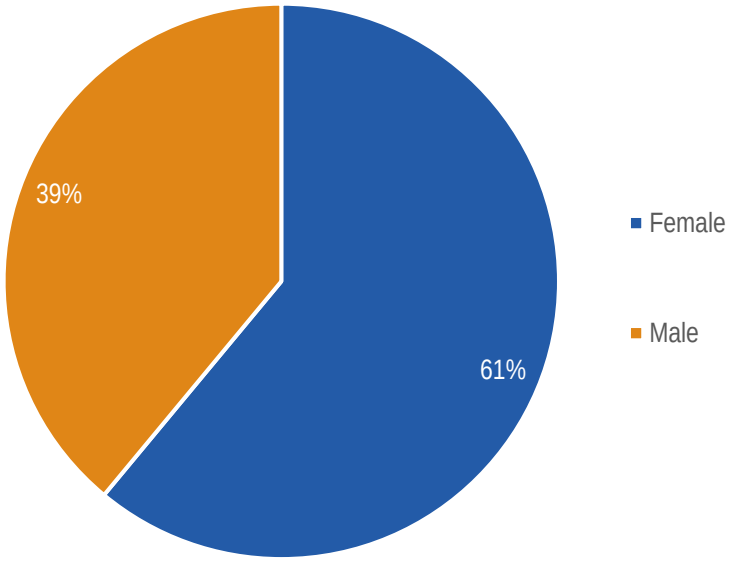
Figure 6 – Heat Map of Survey Responses by Zip Code



Question 6 – Gender

The last demographic question asked participants to provide their gender. 61% of respondents identified as female. Figure 7 illustrates these responses.

Figure 7 - Gender of Respondents



2.2.2 COMMUNITY SURVEY 2018

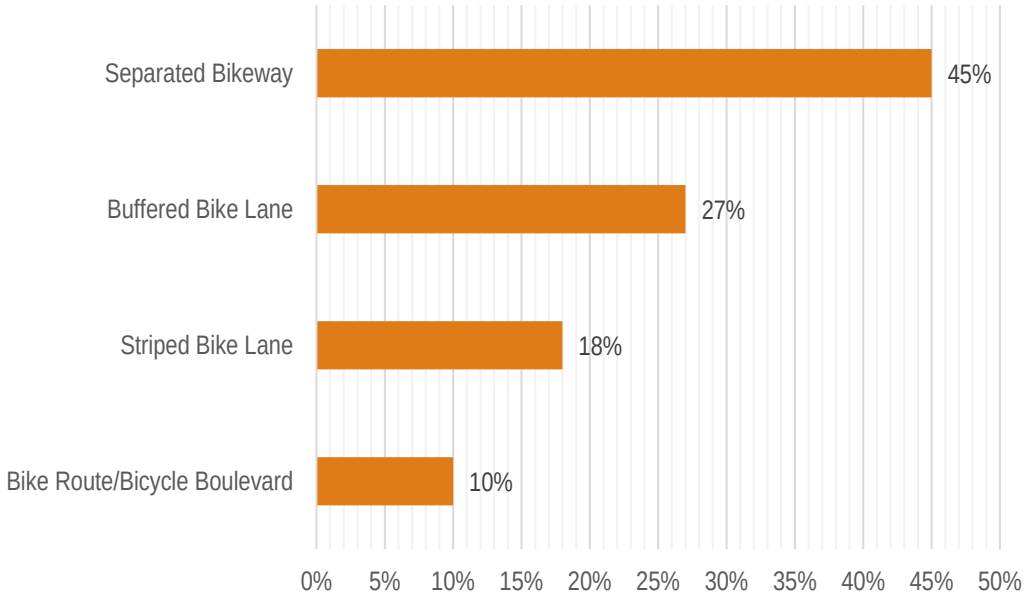
In September 2018, OCTA launched a second online, interactive Typeform survey with more specific questions pertaining to pedestrian and bikeway improvements. The survey was promoted on the OC Active Facebook page, through OC Active booths at outreach events listed in Chapter 2.12 and through Stakeholder Working Group member cities. Member cities were provided with a toolkit to share the survey link via social media platforms and city websites. Over a span of approximately two months, the project team collected approximately 250 responses through the Typeform survey and over 200 additional responses through participation in the Walk to School events outlined in Chapter 2.6. The survey included questions on bikeway and pedestrian investment preferences, biking habits, and factors that discourage biking. 68 participants provided their email for further project updates.

Please see below for a full breakdown of survey results.

Question 1 – On-Street Bikeway Investments

The first survey question asked visitors to select as many types of on-street bikeways they would like to see more investment. Of the 621 people who answered this question, 45% put investment in separated bikeways as a priority. The breakdown of the on-street bikeway priorities is shown in Figure 8.

Figure 8 – On-Street Bikeway Investment Priorities

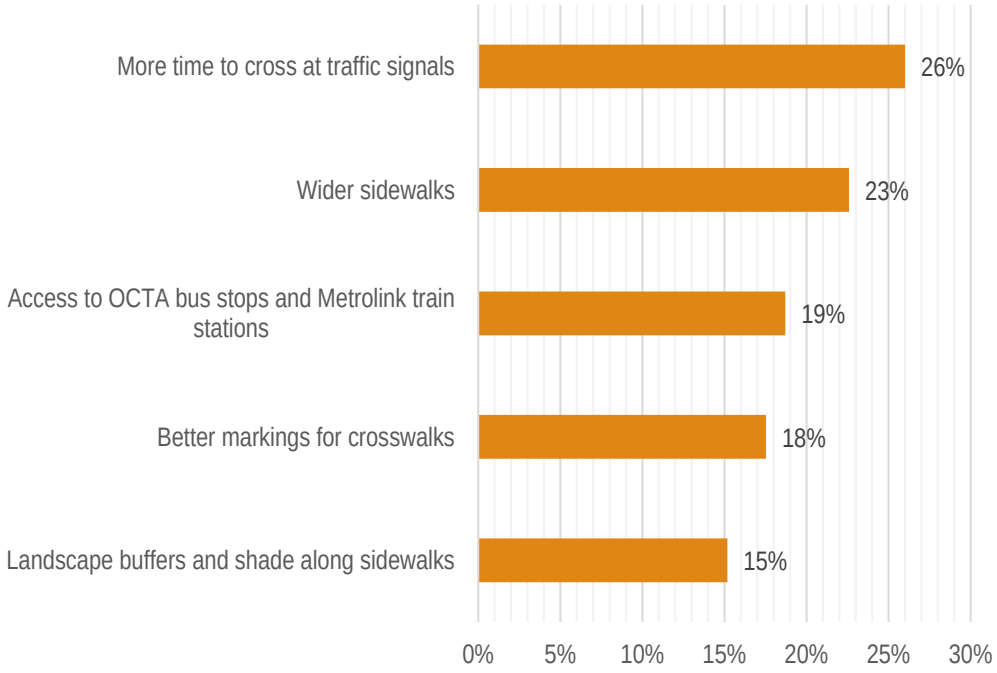


Question 2 – Pedestrian Improvements

The second survey question asked respondents to select as many types of pedestrian improvements they would like to see more investment. A total of 26% of the 850 responses were “More time to cross at traffic

signals" as a priority, followed by "Wider sidewalks" at 23%. The breakdown of the pedestrian priorities is shown in Figure 9.

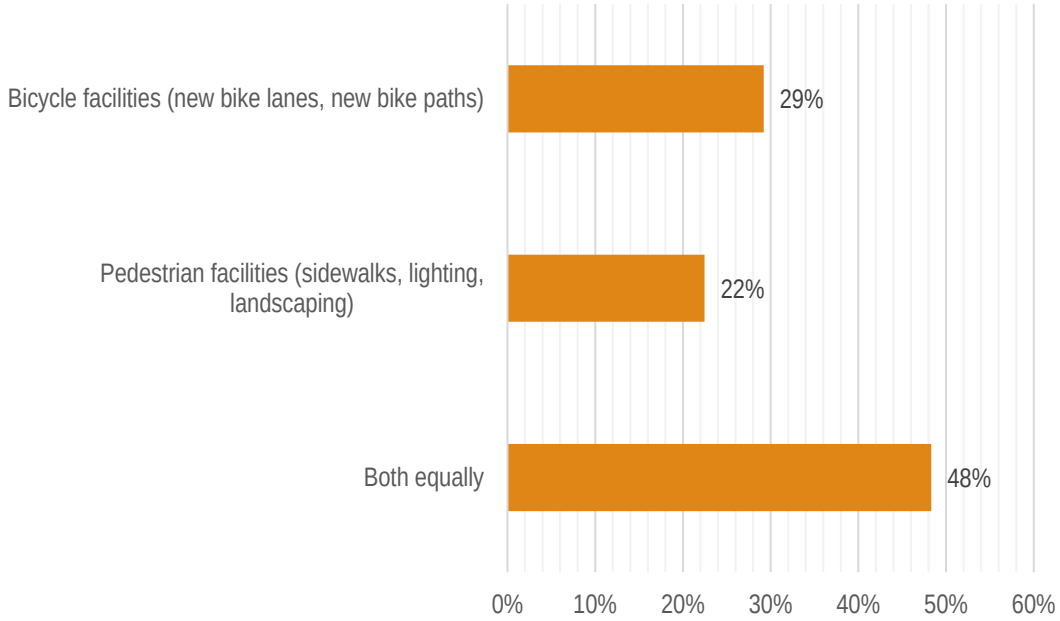
Figure 9 - Pedestrian Improvement Priorities



Question 3 – Physical Improvements

The third survey question asked participants to choose which mode is in more need of physical improvements. Nearly half of respondents weighed both improvements in bicycle and pedestrian facilities equally. With 29% of people choosing to prioritize bicycle facilities over pedestrian ones. Figure 10 breaks down the results of question 3.

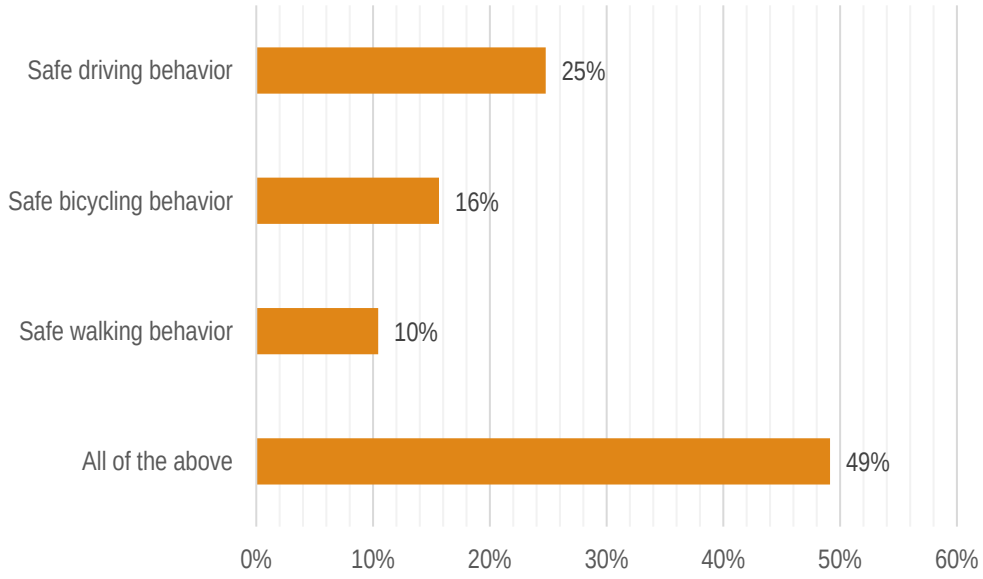
Figure 10 - Physical Improvements Priorities



Question 4 – Educational Programs

The fourth survey question asked respondents to select education programs they think would be helpful in the community. Nearly half of the 460 respondents thought all the programs—safe driving, safe bicycle, and safe walking behavior—would be beneficial to the community. Safe driving behavior was the most popular of the three at 25%. The breakdown of the pedestrian priorities is shown in Figure 11.

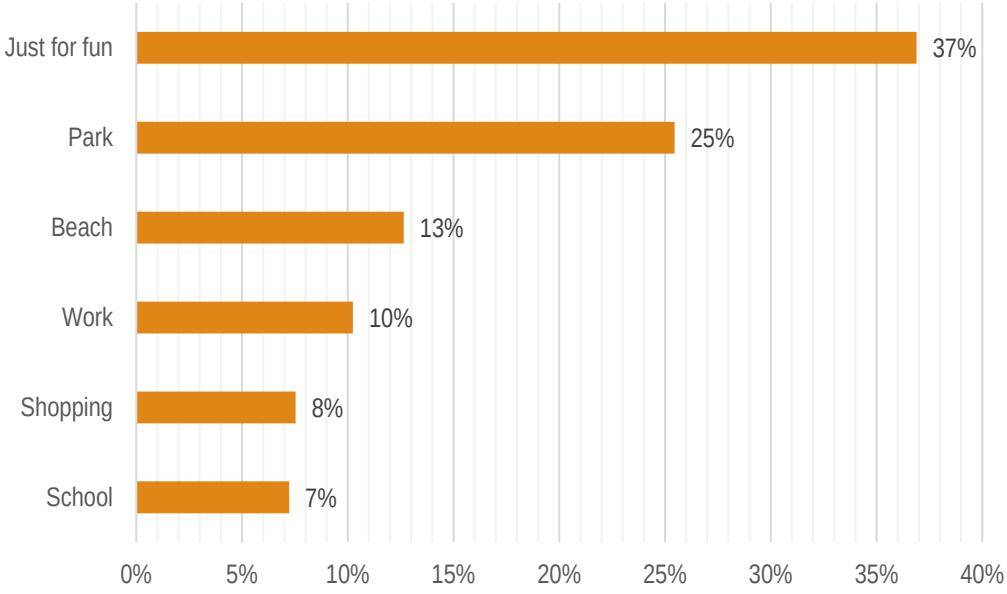
Figure 11 - Educational Programs Priorities



Question 5 – Biking Locations

The fifth survey question asked visitors where they like to or most often ride their bikes. Approximately 75% of the respondents prefer to ride their bikes recreationally, whether just for fun, or at the park or beach. The breakdown of where people most like to ride their bikes is shown in Figure 12.

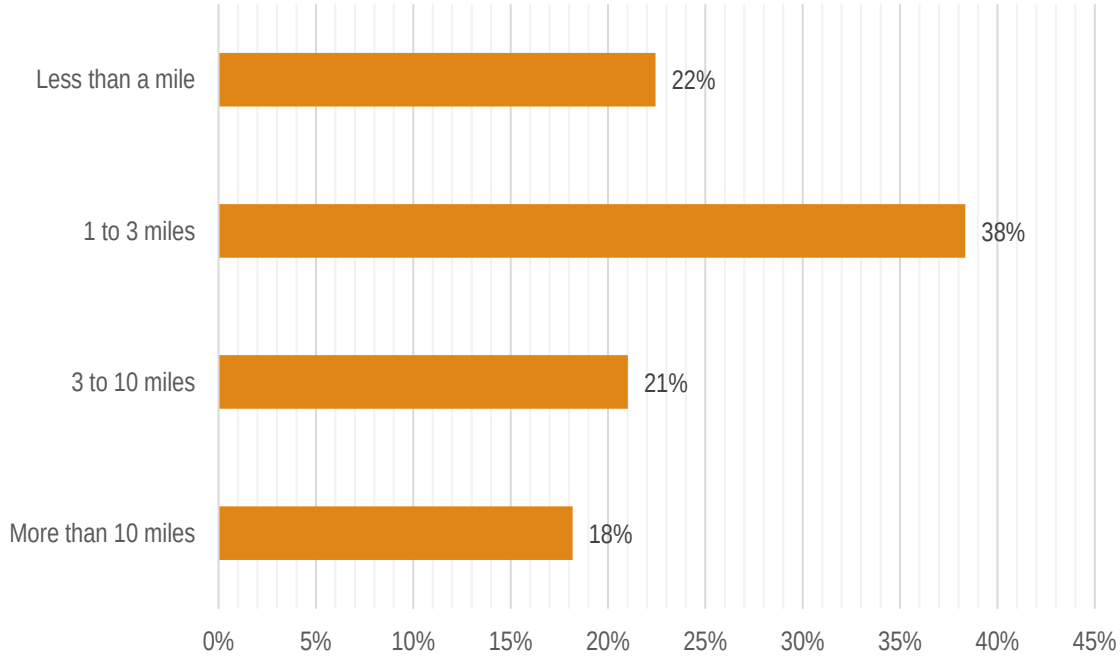
Figure 12 - Where People Most Like to Ride Their Bikes



Question 6 – Biking Distance

The sixth survey question asked respondents how far they ride their bike one-way to the location they chose in question 5. With 60% of the 352 respondents riding their bike three (3) miles or less one-way. The breakdown of the distances participants ride is shown in Figure 13.

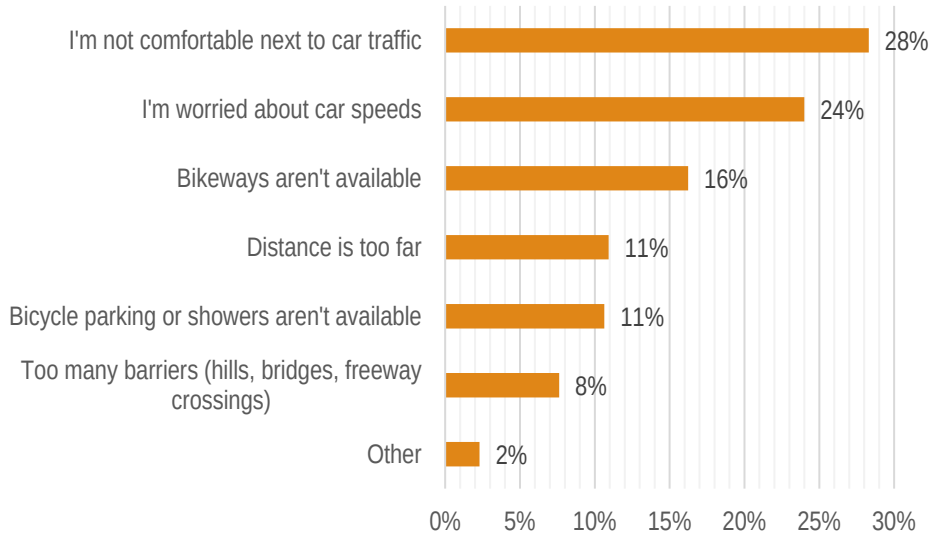
Figure 13 - General One-Way Bike Distance



Question 7 – Factors that Discourage Biking

The seventh survey question asked respondents to select all the factors that prevent or discourage them from riding their bike more often. The top two factors discouraging biking related to cars. Of the 696 responses, 28% were not comfortable next to car traffic and 24% were worried about car speeds. Figure 14 illustrates the breakdown of the things that discourage biking.

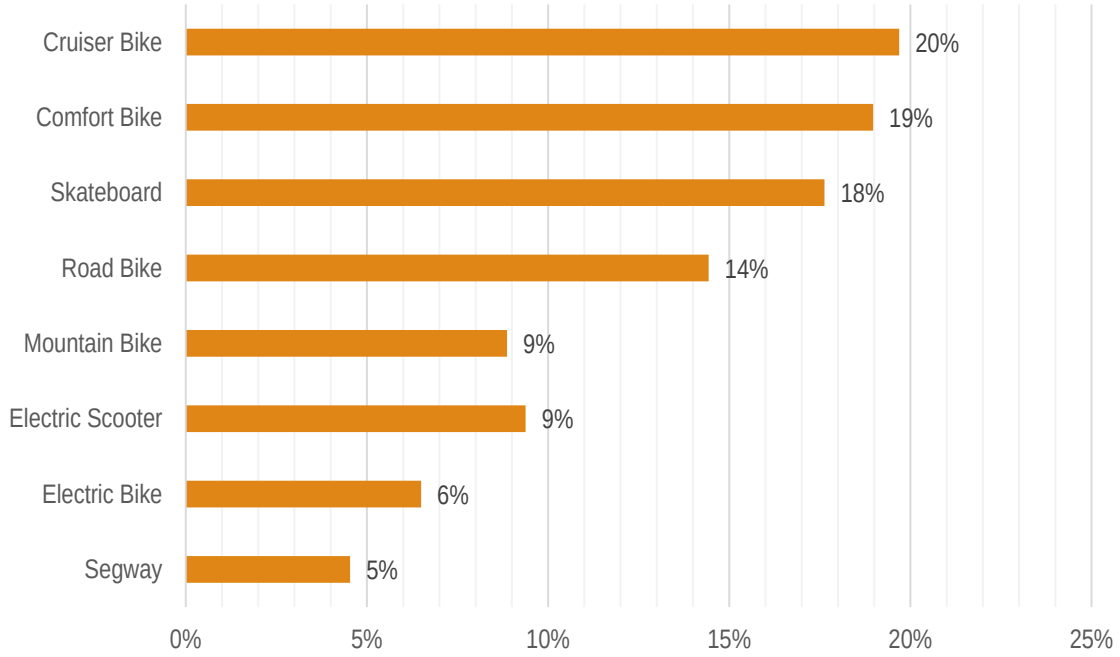
Figure 14 - Factors that Discourage Biking



Question 8 – Active Transportation Mode Preference

The eighth survey question asked respondents what mode of active transportation they prefer. There were 970 responses to this question, with cruiser bikes at 20% and comfort bikes closely following at 19%. Figure 15 illustrates the breakdown of active transportation mode preferences.

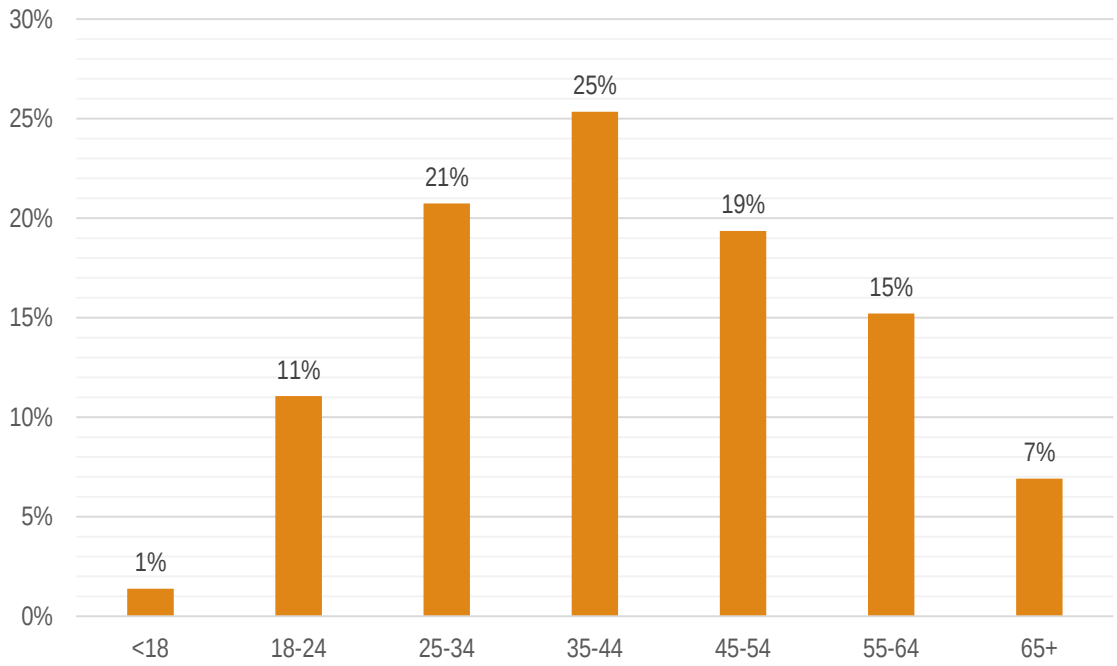
Figure 15 - Transportation Mode Preference



Question 9 – Age

The next few questions were questions regarding demographics. Question 9 asked participants to input their age. Results indicate that most respondents are in their mid-20s to mid-50s. Figure 16 breaks down the results for this question.

Figure 16 - Age of Respondents



Question 10 – Zip Code

Question 10 asked participants to provide their home zip codes. 225 people answered this question. Table 5 lists some of the most common zip codes of survey participants.

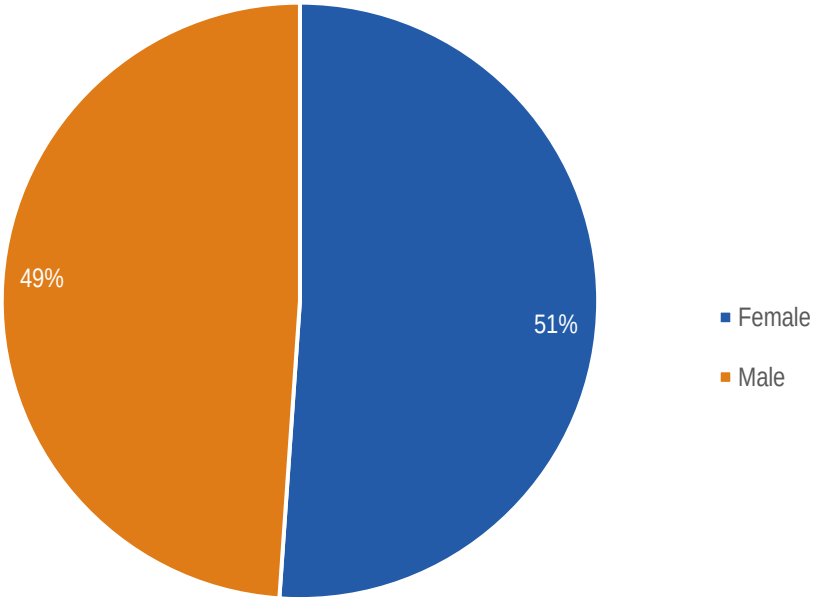
Table 5 - Significant Zip Codes of Respondents

Zip Code	Orange County Cities
90620	Buena Park
92630	Lake Forest
92683	Westminster
92692	Mission Viejo
92821	Brea

Question 11 – Gender

The last demographic question asked participants to provide their gender. With 51% of the 227 people stating they were female. Figure 17 illustrates these responses.

Figure 17 - Gender of Respondents



2.3 CHALK, WALK, & ROLL CONTEST

To promote project awareness and to encourage safe walking and bicycling, the project team developed a chalk contest for Orange County schools. All elementary, middle and high schools were eligible to participate in the contest. Contestants were asked to design and implement a chalk drawing reflecting the "walk and roll" theme at their school and submit a photo online to enter the contest. The winning schools were determined by the number of votes received on social media (OC Active Facebook Page).

A total of 646 schools were invited to participate in the chalk contest with seven (7) schools submitting entries. The winners for high school and middle school contests received 426 and 313 Facebook votes respectively. The project Facebook page was utilized extensively to promote the contest through frequent promotional posts and paid advertisements. In addition to the chalk contest, the online community survey was promoted on the project Facebook page as well, which resulted in directing many contest participants to the survey page. Based on the survey results, 5% of survey participants were from the "under 18" age group; significantly higher than the average for this age group which is typically around 1%.

Appendix B includes an infographic highlighting the Chalk, Walk & Roll Contest and OC Active Facebook page activities.

2.4 CRUISE WITH A COP EVENT

To encourage safe walking and bicycling, the project team partnered with the Anaheim Police Department, Orange County Health Care Agency (OCHCA), and the City of Anaheim Community Services Department to hold the Cruise with a Cop event at Maxwell Park in Anaheim. Direct outreach was conducted to the closest five elementary schools with take home fliers for the approximate 4,000 attending students. In addition, the project team coordinated flier placement at Maxwell Library, direct signage along the bike paths and trail around the park, and a promotional banner at the baseball field at Maxwell Park. Moreover, the project Facebook page and Anaheim's PD Facebook page were utilized to promote the event through frequent promotional posts.

The event took place on Saturday March 24th, 2018, and over 75 kids and parents participated. The project team set up five (5) activity stations at Maxwell Park. The Anaheim Police Department had a free helmet station to ensure that every child in their community could ride safely. Approximately 50 helmets were given out to kids. Anaheim Community Services also set up an informational booth giving out information about community events. At the OCHCA booth, kids learned about helmet safety by taking part in an activity where they could drop an egg into a bucket of dirt to demonstrate how helmets would protect their head. The project team had two stations. At the first station, they discussed the OC Active plan and general OCTA information. The second station was an activity station where kids could decorate their new helmets with stickers and paint. At the activity station there was also a giant vinyl of a bus, provided by OCHCA, where kids decorated and painted something related to active transportation. These activities were followed with a bike cruise around Maxwell Park led by the Anaheim PD's traffic mascot, Oscar el Oso.

Appendix G includes pictures of the Cruise with a Cop event and promotional Facebook posts.

2.5 STAKEHOLDER WORKING GROUP

To provide a venue for discussion of OC Active concepts and solicit input on the plan, OCTA formed a Stakeholder Working Group (SWG) consisting of agency staff and key community members. The purpose of the SWG was to discuss and review ideas, provide input, and communicate to constituents for OC Active.

Key goals for the SWG include the following:

1. Provide recommendations on technical and strategic decision points during development of OC Active.
2. Identify potential outreach activities for engagement with the public to solicit input on the survey tool.
3. Promote OC Active to membership lists.

SWG members consisted of the following organizations:

Government

1. City of Aliso Viejo
2. City of Anaheim
3. City of Brea
4. City of Buena Park
5. City of Costa Mesa
6. City of Garden Grove
7. City of Huntington Beach
8. City of Irvine
9. City of La Habra
10. City of Lake Forest
11. City of Newport Beach
12. City of Santa Ana
13. City of Tustin
14. City of Vila Park
15. City of Yorba Linda
16. Caltrans
17. OC Parks or County of Public Works
18. OCTA Technical Advisory Committee
19. Orange County Council of Governments

Community Organizations and Service Providers

20. Alliance for a Healthy Orange County
21. Blue Shield
22. OC Health Care Agency
23. Orange Coast College Food Riders

24. Orange County Department of Education
25. Safe Routes to School National Partnership
26. St. Jude Medical Center

Industry and Community Groups

27. Alta
28. Cal Bike
29. Irvine Bicycle Club
30. OCTA Citezens Advisory Committee Bicycle/Pedestrian Subcommittee
31. OCTA Citizens Advisory Committee
32. Orange County Bicycle Coalition
33. Orange County Wheelman
34. People for Housing
35. Santa Ana Active Streets

Overall, two SWG meetings were held by OCTA. See below for meetings details.

Meeting 1: Wednesday, September 27, 2017 at OCTA Headquarters

The purpose of the meeting was to provide stakeholders with background on the OC Active project, an overview of the project's current status, and to discuss the next steps of the project.

Meeting 2: Thursday, February 1, 2018 at OCTA Headquarters

The purpose of the meeting was to provide stakeholders with a recap of the first SWG meeting, discuss changes made to the pedestrian model based on comments received from the first meeting and the updated results of the pedestrian model, solicit feedback on the regional bikeways network, and introduce the pedestrian/bicycle best practices toolkit.

2.6 WALK TO SCHOOL EVENTS

To collect more feedback on pedestrian and bikeway improvements while raising the awareness of the OC Active project, the project team partnered with the Orange County Health Care Agency (OCHCA) to participate in the annual Walk to School Day, which promotes the health benefits of walking or biking to school. The project team engaged with five (5) schools across each of the five supervisorial districts: Diamond Elementary School, Rossmoor Elementary, Benson Elementary School, Las Positas Elementary School, and San Juan Elementary School. Table 6 below lists the school and event information.

To promote the Walk to School events, the project team developed a take-home flyer and a media release for each school. In addition, a social media toolkit was prepared that provided ready-made social media blurbs for schools to promote the event on their Facebook and Twitter pages.

The events took place on Wednesday, October 10th, 2018, and over 500 students and parents participated across all the schools. Students, teachers, parents, and community members met at nearby parks before walking a few blocks to their respective schools. At each of the schools, the project team set up a table with general OCTA information, OC Active fact sheets, and project giveaways to engage with school faculty and parents as they arrived on campus. Display-board versions of the "OC Active Rolling and Walking Survey" were displayed. Parents were encouraged to take the full survey on an iPad kiosk or use dot stickers to quickly mark their choices on the display boards.

Table 6 - Walk to School Event Information

District	School	Address	Start Time
1	Diamond Elementary School	1450 S Center St Santa Ana, CA 92704	7:30 AM
2	Rossmoor Elementary	3272 Shakespeare Dr Los Alamitos, CA 90720	7:15 AM
3	Benson Elementary School	12712 Elizabeth Way Tustin, CA 92780	7:25 AM
4	Las Positas Elementary School	1400 Schoolwood Dr La Habra, CA 90631	7:20 AM
5	San Juan Elementary School	31642 El Camino Real San Juan Capistrano, CA 92675	7:05 AM

Appendix H includes pictures of the Walk to School events and promotional items.

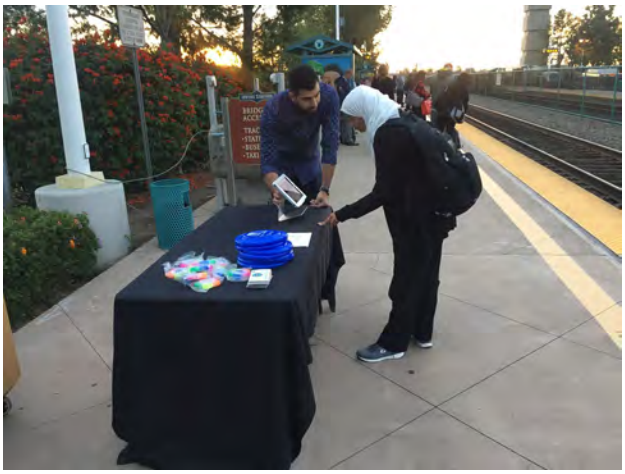
4 Appendices

APPENDIX A – EVENT PHOTOS

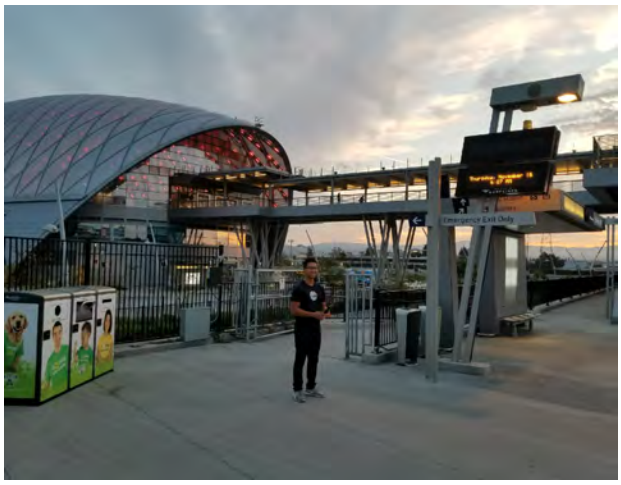
8/31 – runDisney Expo – Anaheim

10/21 – Hallow's Eve Bowl Jam – Laguna Niguel

10/26 – Anaheim Farmers Market – Anaheim



11/16 – Irvine Metrolink Station – Irvine



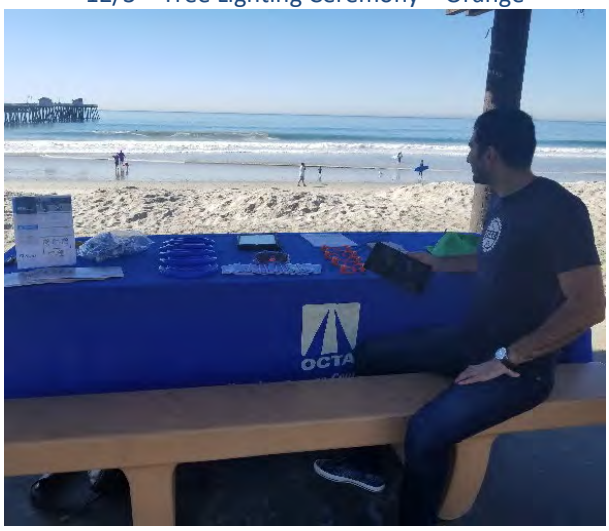
11/16 – Anaheim Metrolink Station – Anaheim

11/26 – Tamale Festival – La Habra

12/2 – Winter Wonderland – Los Alamitos

12/3 – Tree Lighting Ceremony – Orange

12/7 – Christmas Tree Lighting Ceremony – Stanton



12/12 – San Clemente Pier – San Clemente

12/13 – Newport Boat Parade – Newport Beach

12/18 – Newport Beach Pier – Newport Beach

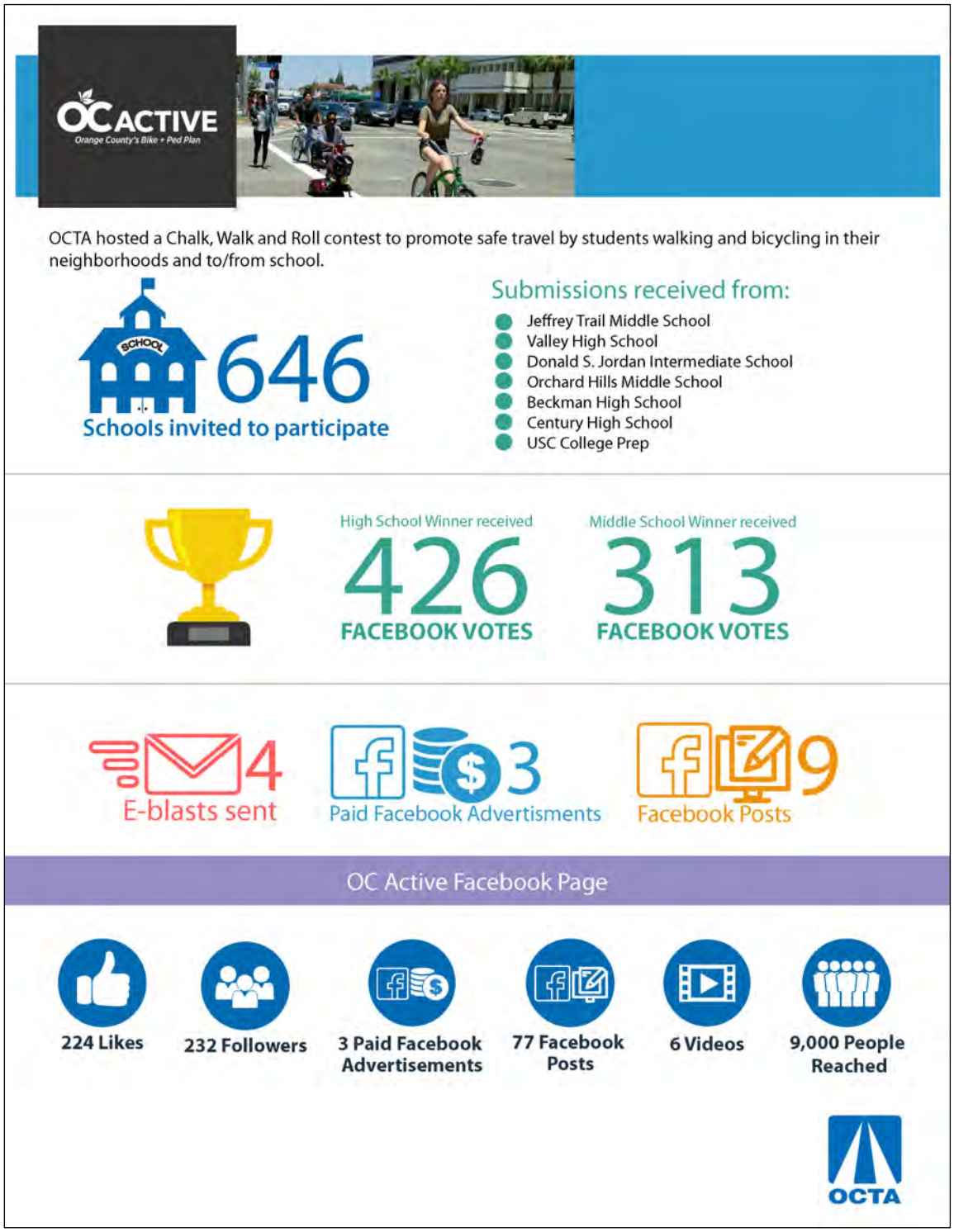
9/15 – Fiestas Patrias Festival – Santa Ana

9/21 – West Garden Grove Bike Rodeo – Garden Grove

9/22 – LRTP Community Event – Orange

10/20 – Walk Against Drugs – Mission Viejo

APPENDIX B – OC ACTIVE CHALK CONTEST, FACEBOOK OUTREACH INFOGRAPHIC, AND SUBMITTALS



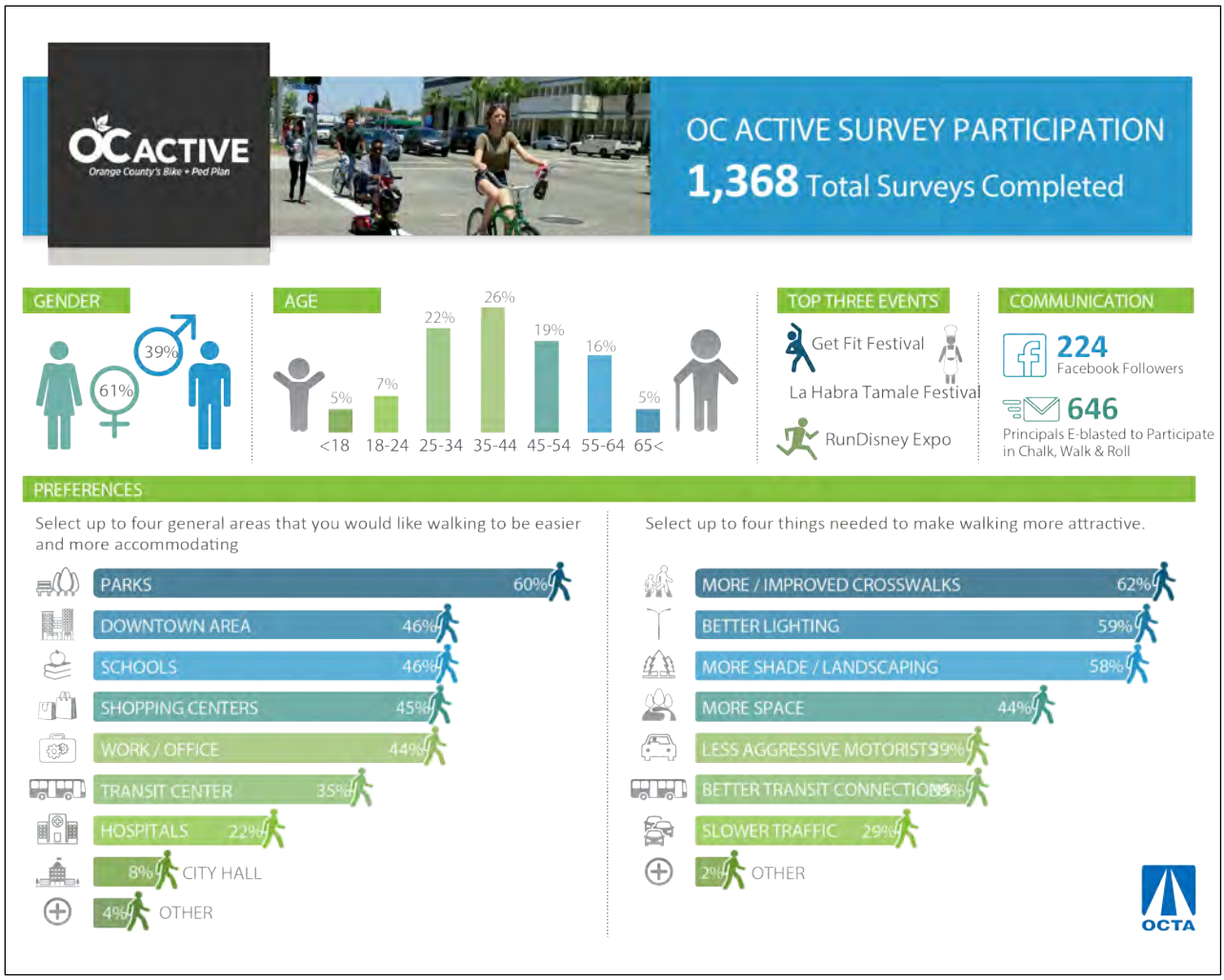

WE WALK, BIKE, ROLL!
WALK, BIKE, RIDE,


ORCHARD HILLS SCHOOL
Walk and Roll


Skating
Freedom


Santa Ana
Walk & Roll to School

APPENDIX C – OC ACTIVE SURVEY INFOGRAPHIC



APPENDIX D – PROJECT FACT SHEET

OC ACTIVE
ORANGE COUNTY'S BIKE + PED PLAN

COMMUNITY OUTREACH:
Emily Mason
Community Relations Specialist
(714) 560-5421
emason@octa.net

GET INVOLVED

Take the online survey
octa.net/OCActiveSurvey

Visit our website
octa.net/OCActive

Follow us on Facebook
Facebook.com/OCActive

Look for OCTA at your community events

Fact sheet as of 7/12/17

WHAT IS OC ACTIVE?

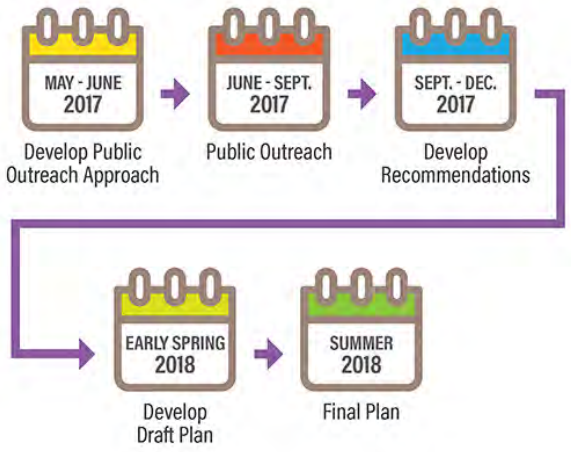
The Orange County Transportation Authority (OCTA) is preparing OC Active; a plan to map out a better plan for walking, rolling, and bicycling. This would be the first comprehensive countywide effort to identify transportation needs and opportunities for both walking and bicycling. The collaborative effort will incorporate detailed work already conducted by local cities and identify pedestrian and bicycle improvement areas throughout Orange County.

The plan will help address pedestrian and bicyclist needs by supporting the development of more sustainable, livable, and efficient mobility in our communities. Once the plan is completed and adopted, it can help local cities secure funding to build a better network for people walking and rolling.

WHAT IS ACTIVE TRANSPORTATION?

Active transportation is human-powered transportation that integrates physical activity into daily routines, such as biking to work, schools or parks. Walking, biking, skating, using a wheelchair and accessing public transportation are all forms of traveling actively. Active transportation increases routine physical activity, reduces the carbon footprint, and can make a positive impact on people's health, happiness, and overall quality of life.

PROJECT SCHEDULE



OCTA
OC ACTIVE
Orange County's Bike + Ped Plan

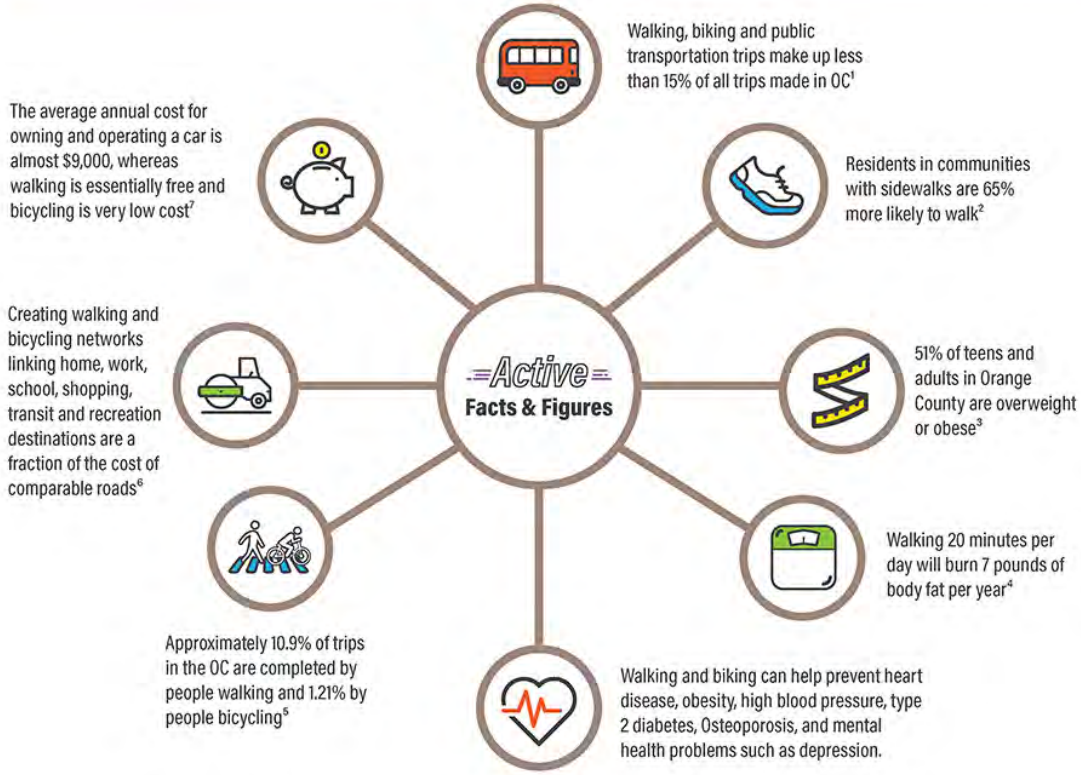
Orange County Transportation Authority
550 S. Main St
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-OCTA
www.octa.net

OC ACTIVE

OCTA ACTIVE ONLINE SURVEY

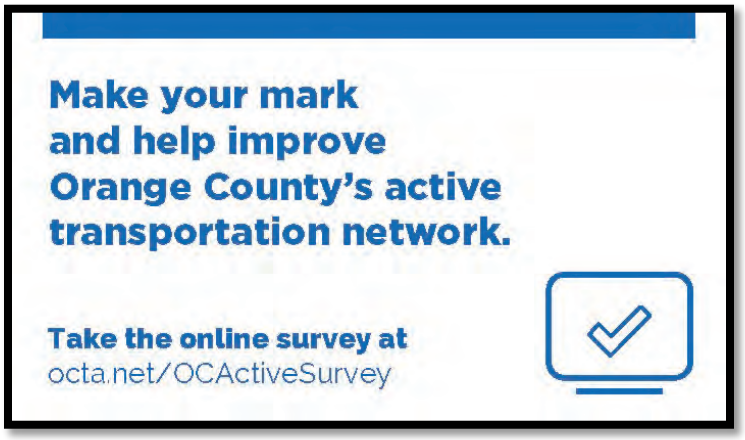
Please help OCTA make Orange County a truly accessible and active community by participating in our online survey. The survey results will provide us with valuable feedback about your active transportation priorities and needs. **You can take the survey at www.octa.net/OCActiveSurvey.**

ACTIVE FACTS AND FIGURES

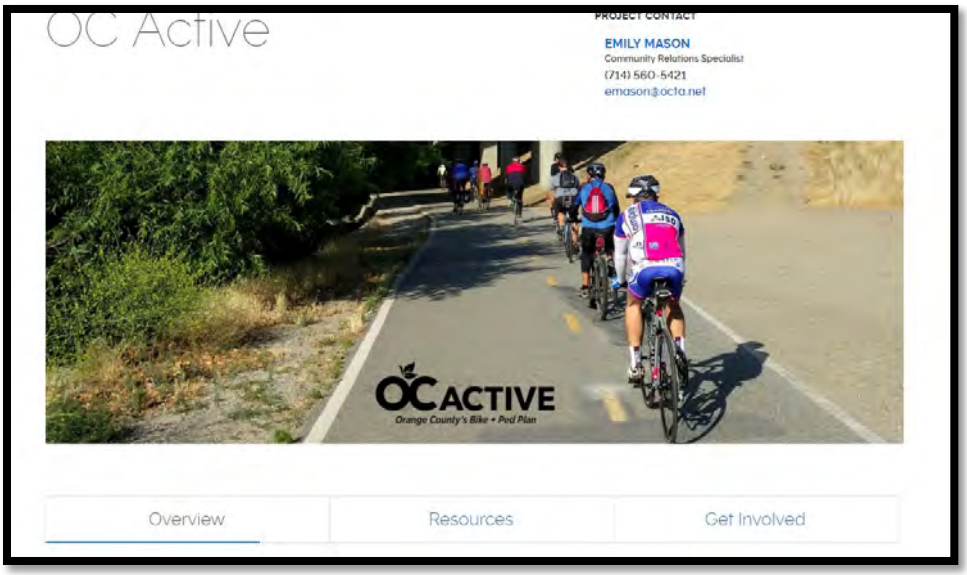


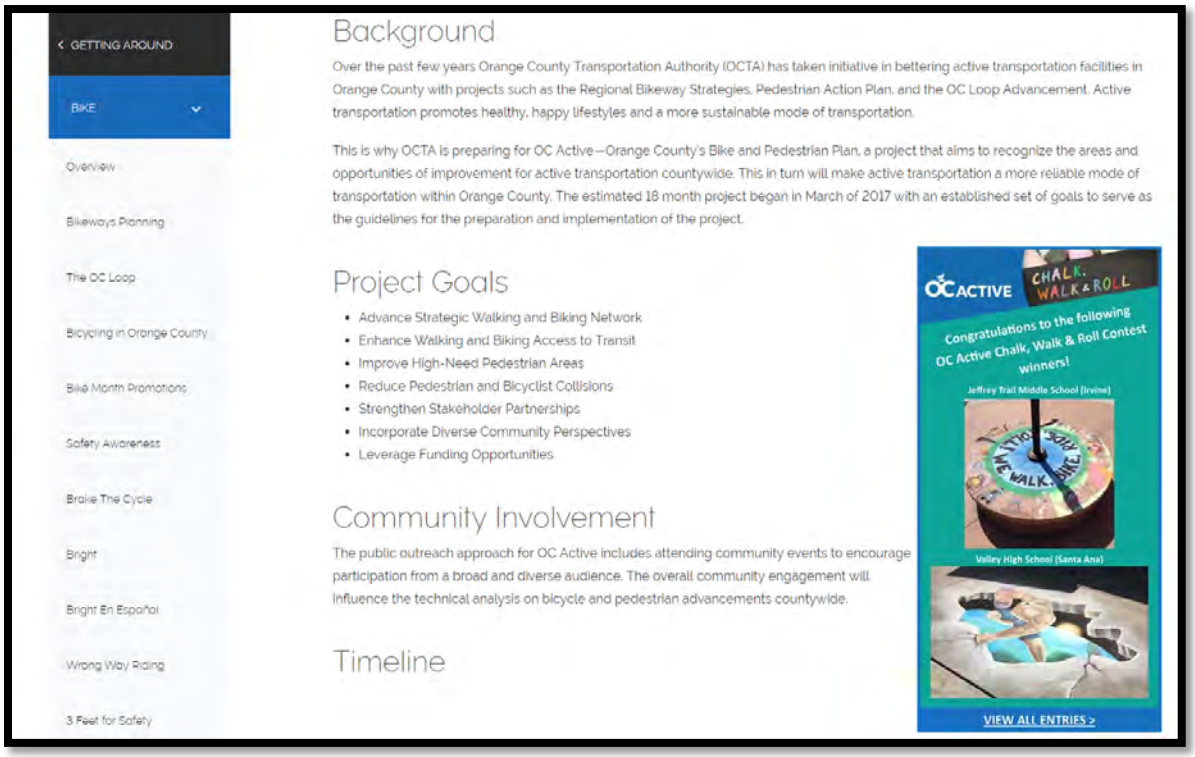
www.octa.net • (714) 560-OCTA

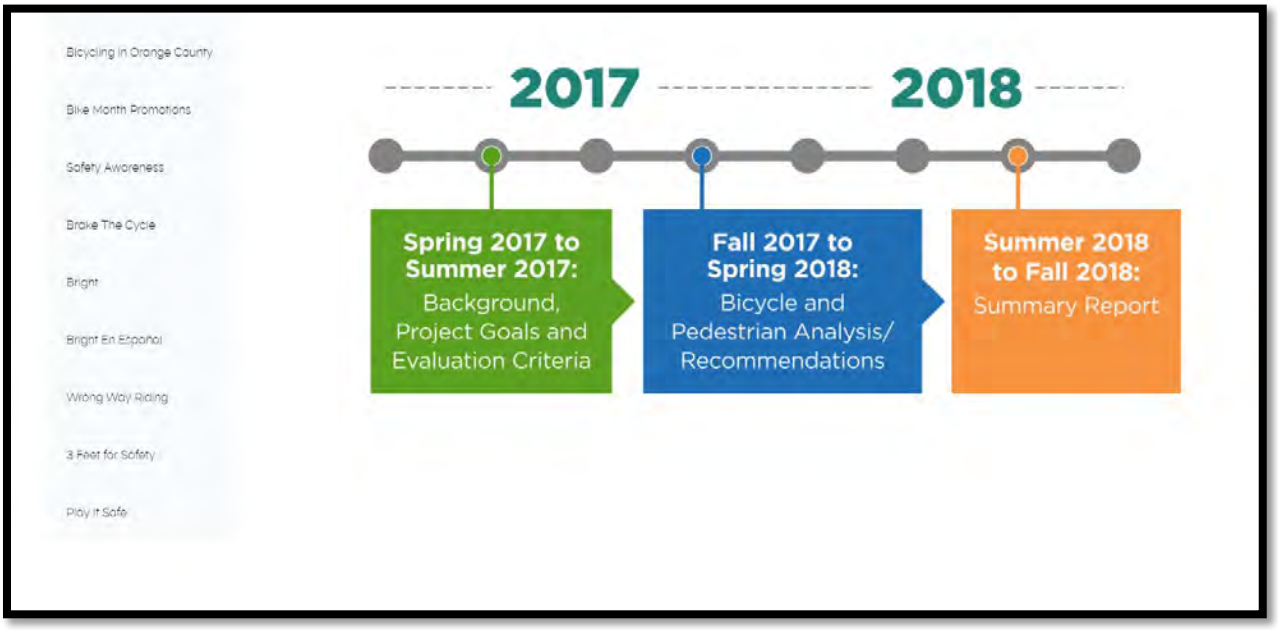
APPENDIX E – BUSINESS CARD



APPENDIX F – PROJECT WEBSITE






Bicycling in Orange County
Bike Month Promotions
Safety Awareness
Brake The Cycle
Bright
Bright En Español
Wrong Way Riding
3 Feet for Safety
Play It Safe
2017
2018
Spring 2017 to Summer 2017: Background, Project Goals and Evaluation Criteria
Fall 2017 to Spring 2018: Bicycle and Pedestrian Analysis/ Recommendations
Summer 2018 to Fall 2018: Summary Report

APPENDIX G – PROJECT FACEBOOK

G.1

G.2

G.3


OC Active
Published by Katie Jagodka [?] · December 28, 2017 ·
Still need to do some holiday shopping? The #OCActive project team will be at a couple shopping centers today to collect feedback on walking and rolling in Orange County and to give out some fun prizes! Find us by the H&M at the San Clemente Outlets until 12pm or at South Coast Plaza 2-4pm. We look forward to speaking with you!
OCACTIVE
OCTA

G.4


OC Active
Published by Taylor Valmores [?] · December 12, 2017 · San Clemente ·
It's great to see everyone active at the San Clemente Pier! Stop by our #OCActive table and tell us how we can get the rest of the County up and moving too!
OCTA

G.5


OC Active
Published by Taylor Valmores [?] · December 6, 2017 ·
Come say hi at Placentia's Tamale Festival! Make sure to be active and walk on over if you're in the neighborhood! #OCActive

G.6


OC Active
Published by Taylor Valmores [?] · December 2, 2017 ·
Come join the festivities at the Winter Wonderland in Los Alamitos with the #OCActive team!

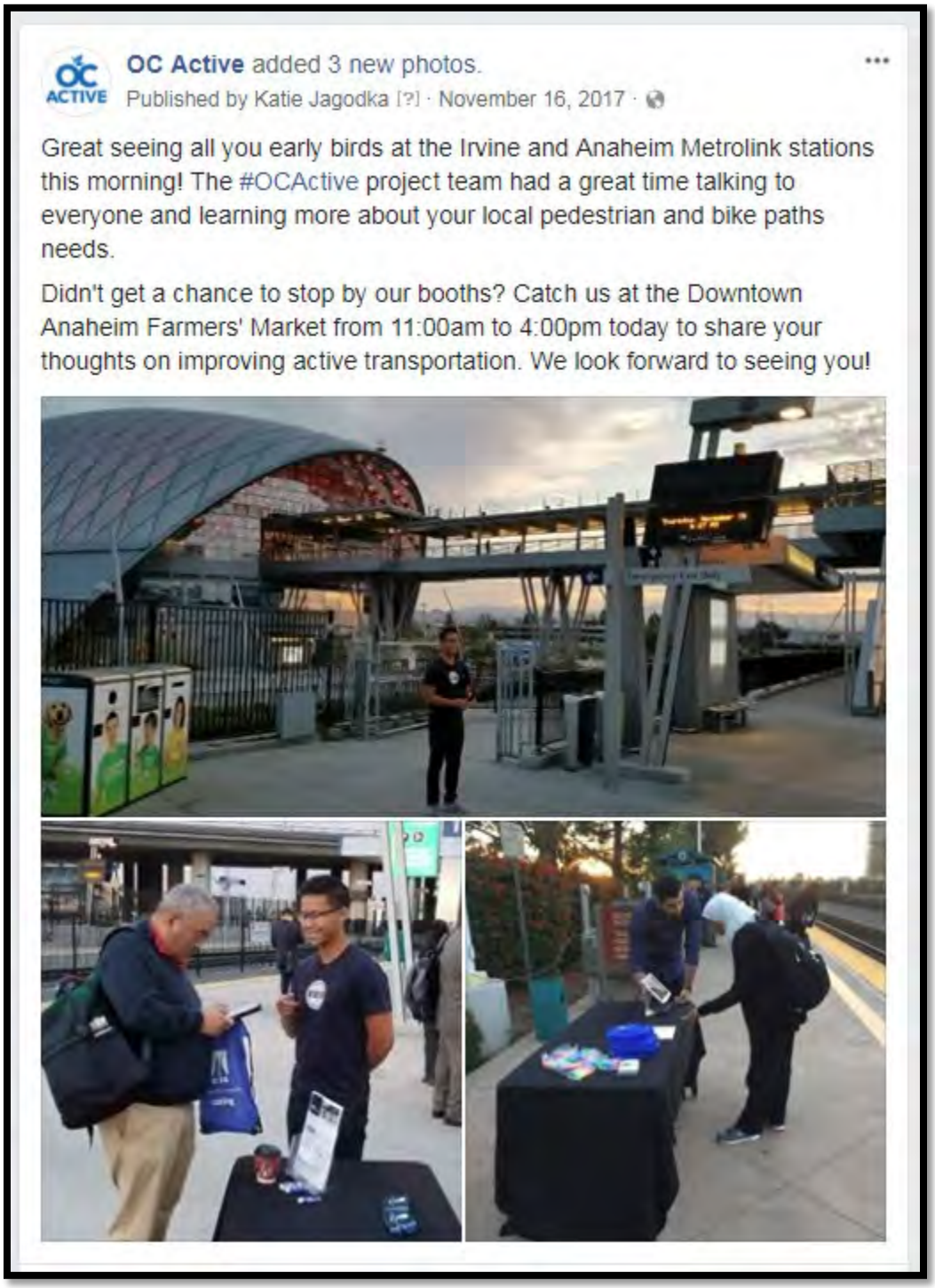
G.7


OC Active
Published by Katie Jagodka [?] · November 27, 2017 ·
We hope everyone had a great time at the City of La Habra TAMALE FESTIVAL yesterday - we sure did! Thank you to those who stopped by our booth to share feedback on improving active transportation in Orange County.

G.8


OC Active
Published by Karina Leanne Diez [?] · November 7, 2017 ·
The #OCActive team is constantly attending local events to spread the news of our #OCActive plan. Be on the lookout for updates on where our next appearance will be. If you'd like us to attend an event in your city, leave a comment for us below.

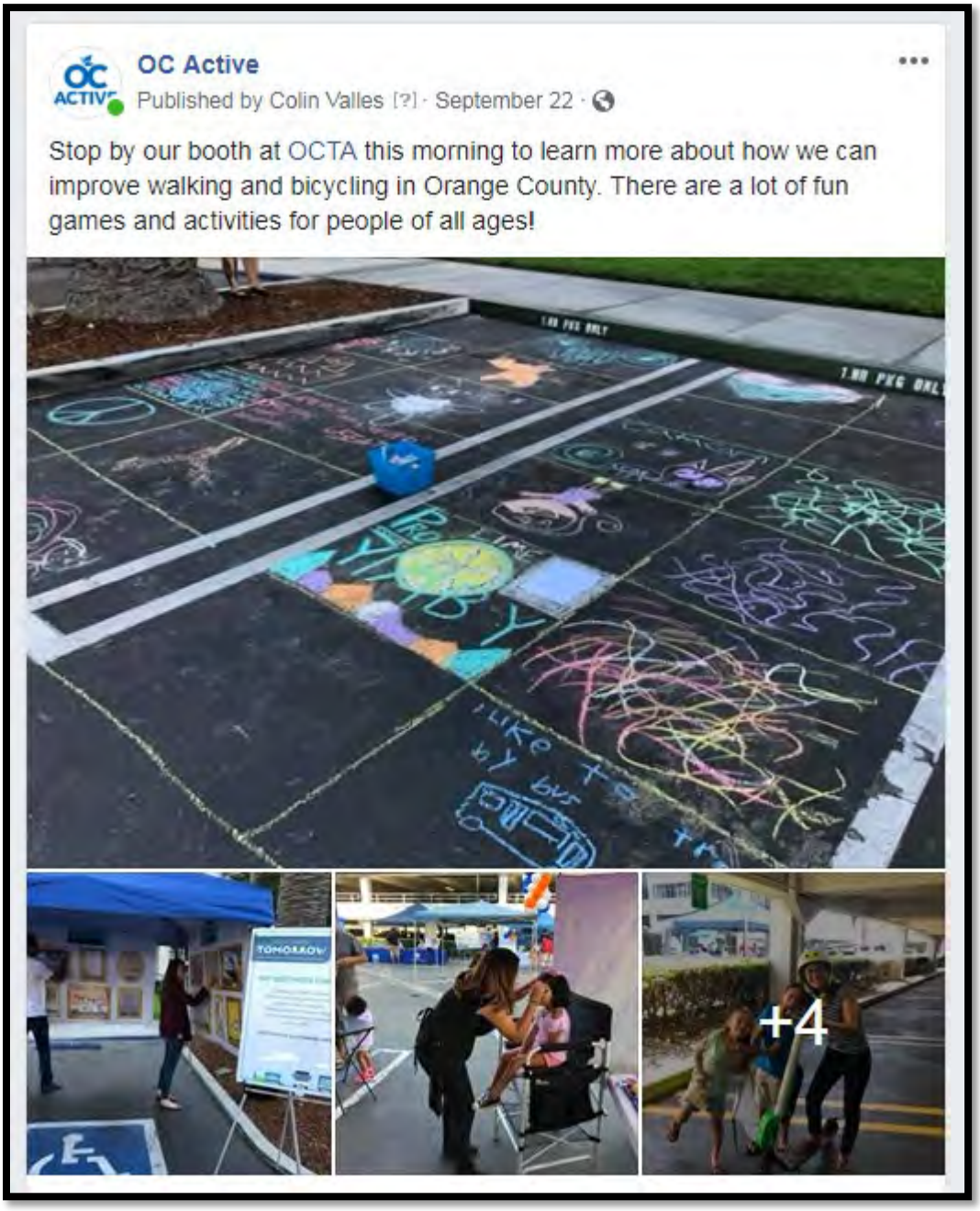
G.9


OC Active added 3 new photos.
Published by Katie Jagodka [?] · November 16, 2017 ·
Great seeing all you early birds at the Irvine and Anaheim Metrolink stations this morning! The #OCActive project team had a great time talking to everyone and learning more about your local pedestrian and bike paths needs.
Didn't get a chance to stop by our booths? Catch us at the Downtown Anaheim Farmers' Market from 11:00am to 4:00pm today to share your thoughts on improving active transportation. We look forward to seeing you!

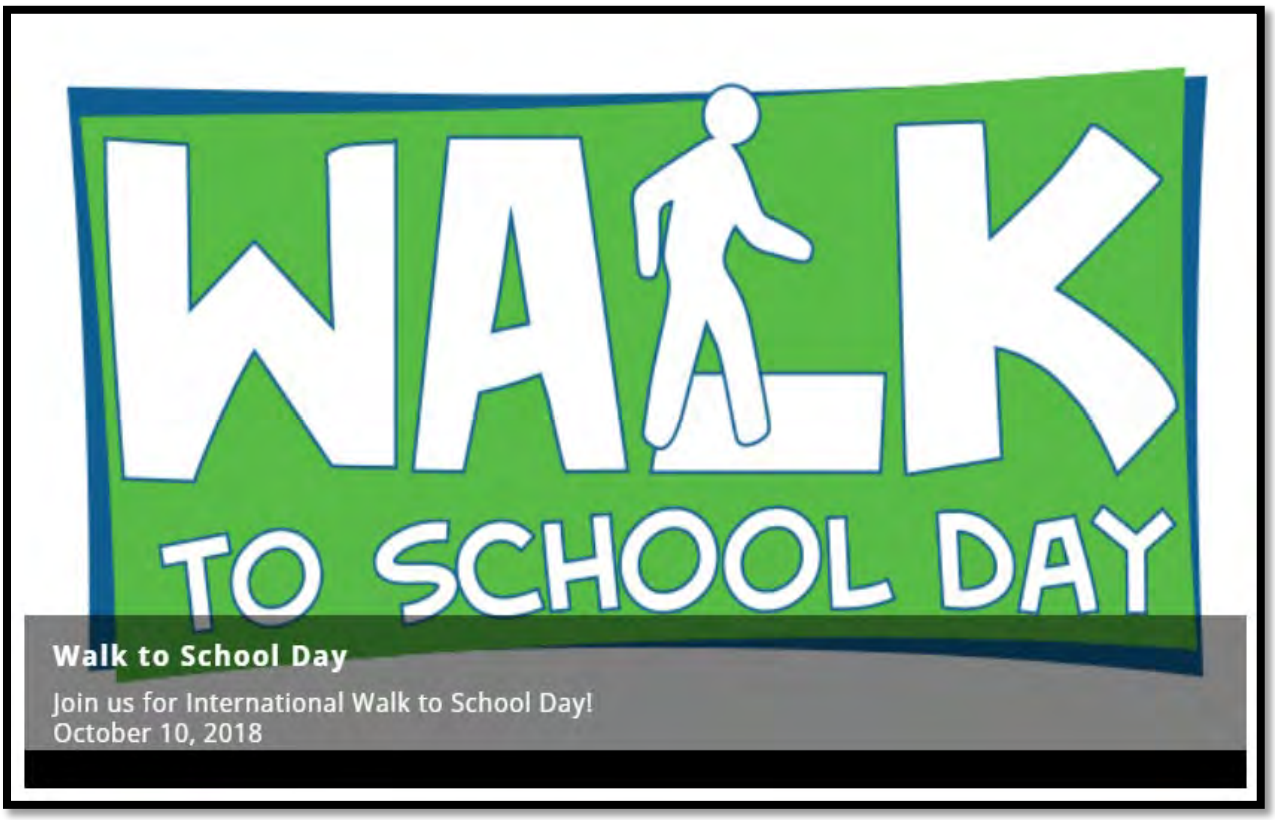
G.10

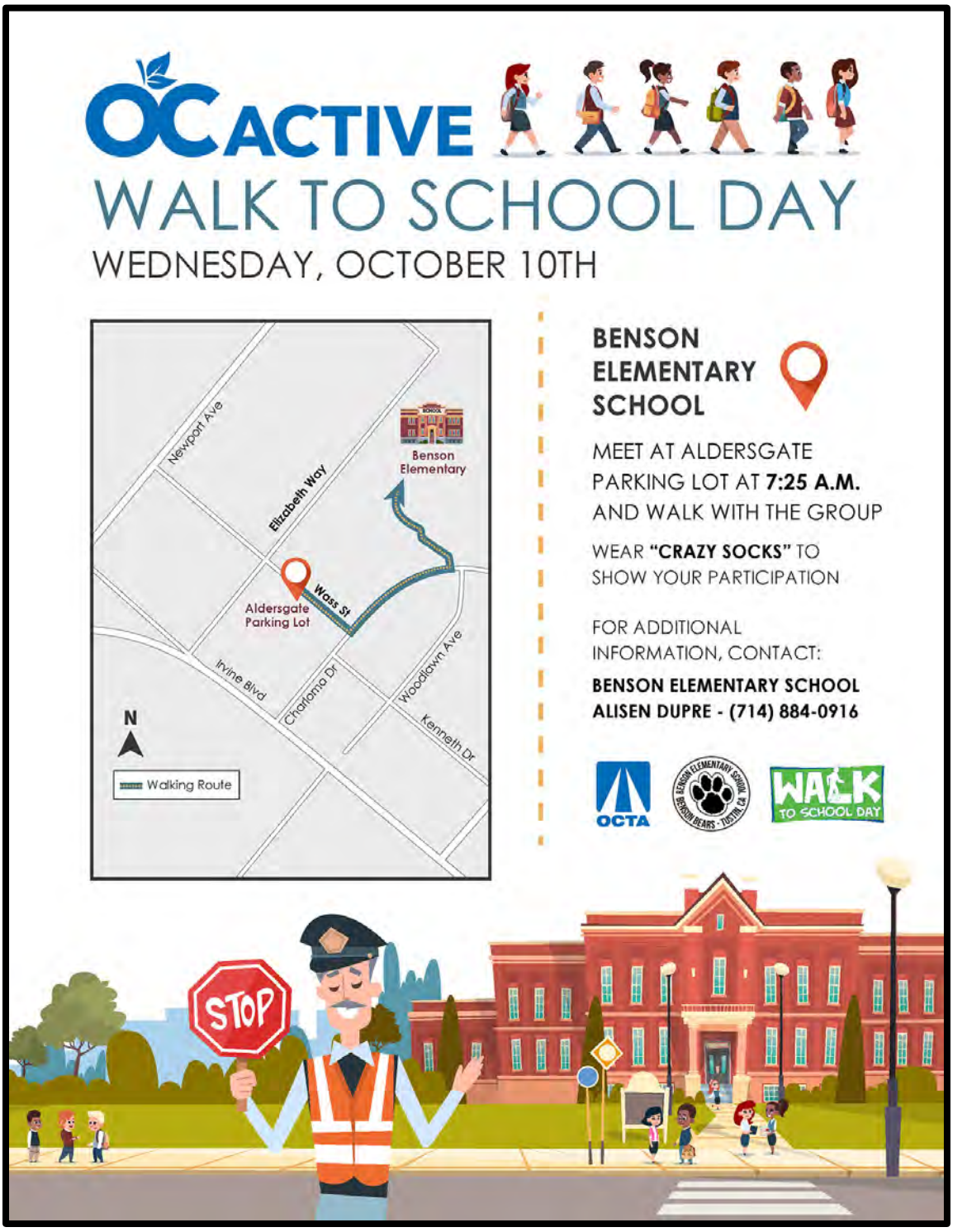

OC Active added 2 new photos.
Published by Taylor Valmores [?] · November 2, 2017 ·
Beware! Heroes and monsters were out in force on Halloween at the City of Rancho Santa Margarita's Fall Family Festival. We were out there talking to Rancho Santa Margarita residents about the OC Active project. Community members had the opportunity to provide their feedback on walking, biking and rolling in the county. Hope everyone had as much fun as we did on Halloween!

G.11


OC Active
Published by Colin Valles [?] · September 22 ·
Stop by our booth at OCTA this morning to learn more about how we can improve walking and bicycling in Orange County. There are a lot of fun games and activities for people of all ages!
+4

APPENDIX H – WALK TO SCHOOL EVENTS




OC ACTIVE
WALK TO SCHOOL DAY
WEDNESDAY, OCTOBER 10TH
Newport Ave
Elizabeth Way
Benson Elementary
Woss St
Aldersgate Parking Lot
Irvine Blvd
Charloma Dr
Woodlawn Ave
Kenneth Dr
N
Walking Route
BENSON ELEMENTARY SCHOOL
MEET AT ALDERSGATE PARKING LOT AT 7:25 A.M. AND WALK WITH THE GROUP
WEAR "CRAZY SOCKS" TO SHOW YOUR PARTICIPATION
FOR ADDITIONAL INFORMATION, CONTACT:
BENSON ELEMENTARY SCHOOL
ALISEN DUPRE - (714) 884-0916
OCTA
WALK TO SCHOOL DAY
STOP

District 1 – Diamond Elementary

District 2 – Rossmoor Elementary

District 3 – Benson Elementary School

District 4 – Las Positas Elementary School

District 5 – San Juan Elementary School

A.2 Scoring Criteria: Pedestrian Level of Comfort

Table A.1 – Scoring for missing sidewalks along road segments with recorded ADT values

ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	2	3	4
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	3	4	4
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	4	4	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	4	4	4

Table A.2 – Scoring for sidewalks with no buffers along road segments with recorded ADT values

ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	2	2	3
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	2	3	4
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	3	4	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	4	4	4

Table A.3 – Scoring for sidewalks with one separation

ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	1	2	3
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	2	3	4
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	4	4	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	4	4	4

Table A.4 – Scoring for sidewalks with multiple separations

ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	1	1	2
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	1	2	3
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	2	3	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	3	4	4

A.3 Scoring Criteria: Bicycle Level of Traffic Stress

Table A.5 – Scoring for Class II bike lanes

ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	1	1	2
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	1	2	3
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	2	3	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	2	4	4

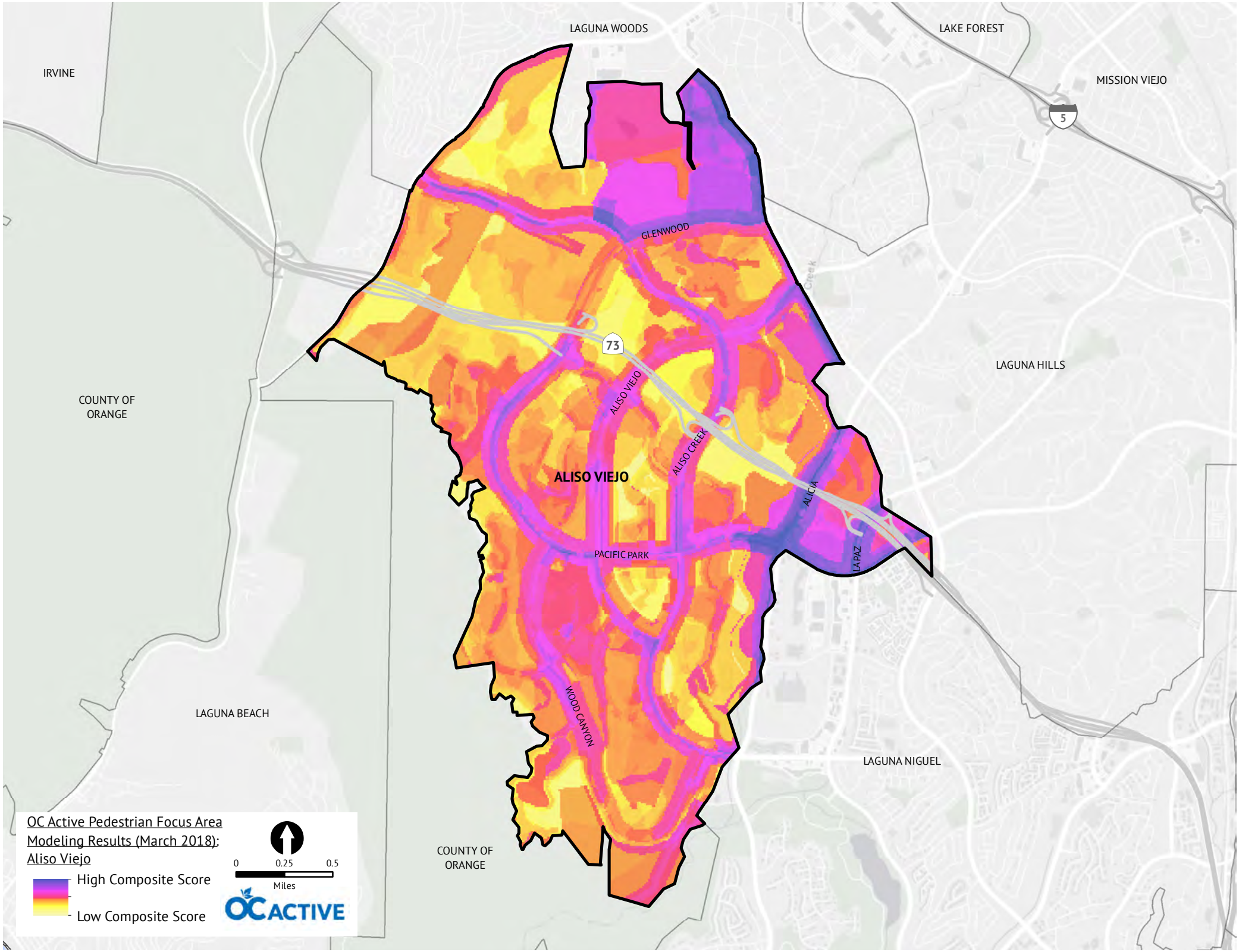
** If recorded data is available, use ADT, if not, use Road Type. If ADT and Road Type is available, then you can apply the higher stress score assigned in the table.*

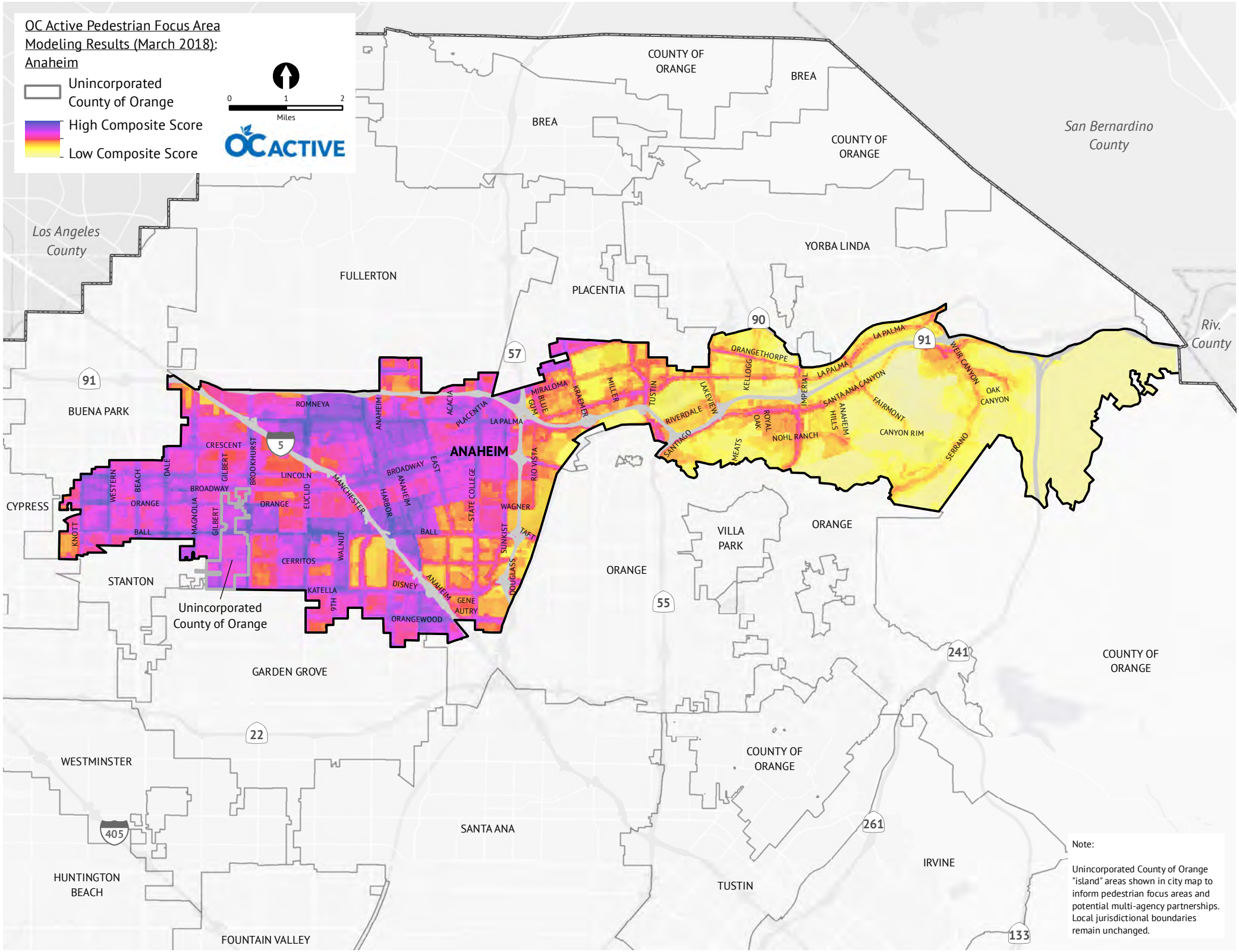
Table A.6 – Scoring for shared roadways

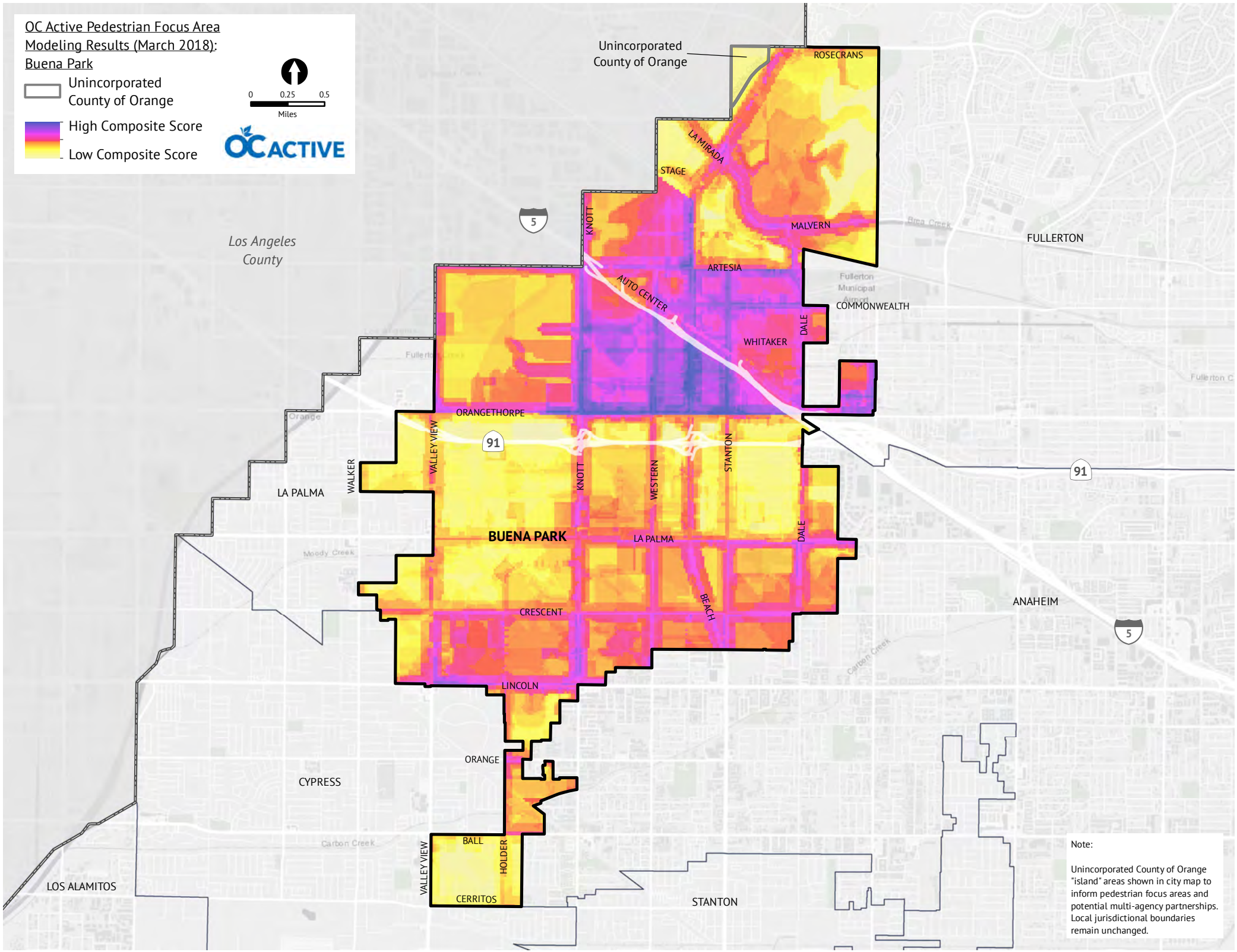
ADT	Road Type	2-3	4-5	6+
0 - 8,000	Collector (Accommodates 7,500 - 10,000 ADT)	1	2	2
8,000 - 25,000	Secondary (Accommodates 10,000 - 20,000 ADT)	2	3	4
>25,000	Primary (Accommodates 20,000 - 30,000 ADT)	3	4	4
	Major (Accommodates 30,000 - 45,000 ADT*)/Principal (Accommodates 45,000 - 60,000 ADT*)	3	4	4

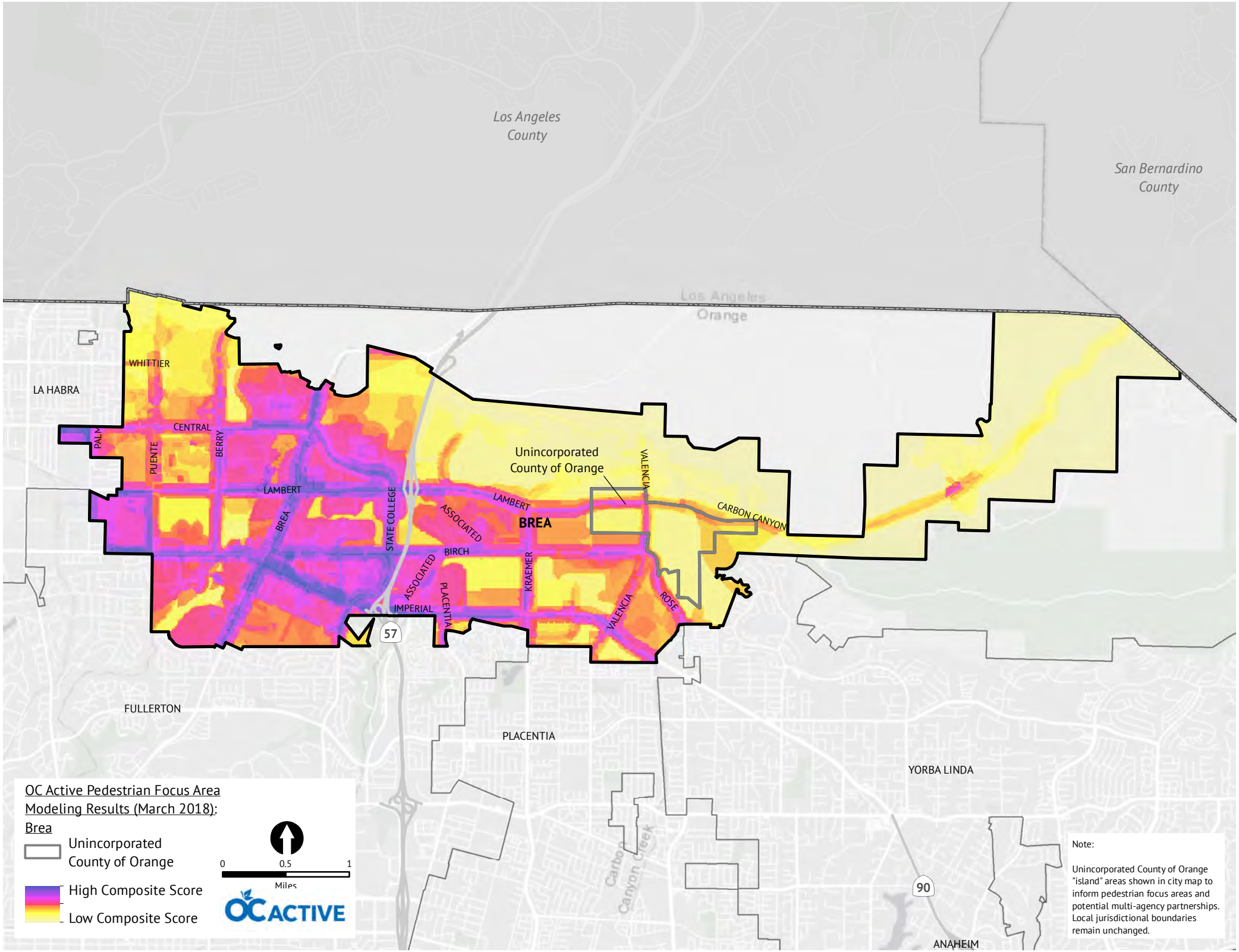
** If recorded data is available, use ADT, if not, use Road Type. If ADT and Road Type is available, then you can apply the higher stress score assigned in the table.*

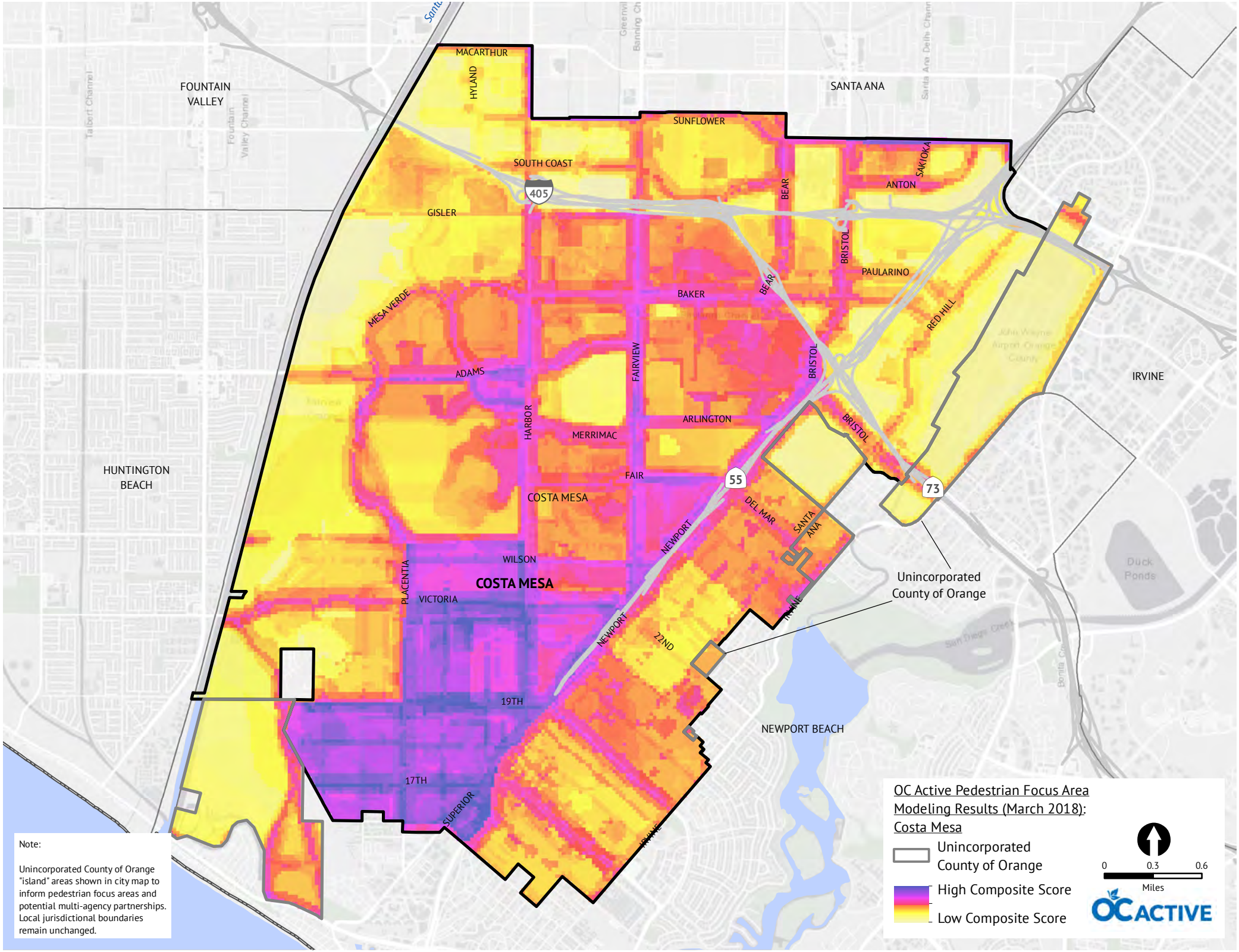
A.4 City-by-City Pedestrian Focus Area Maps

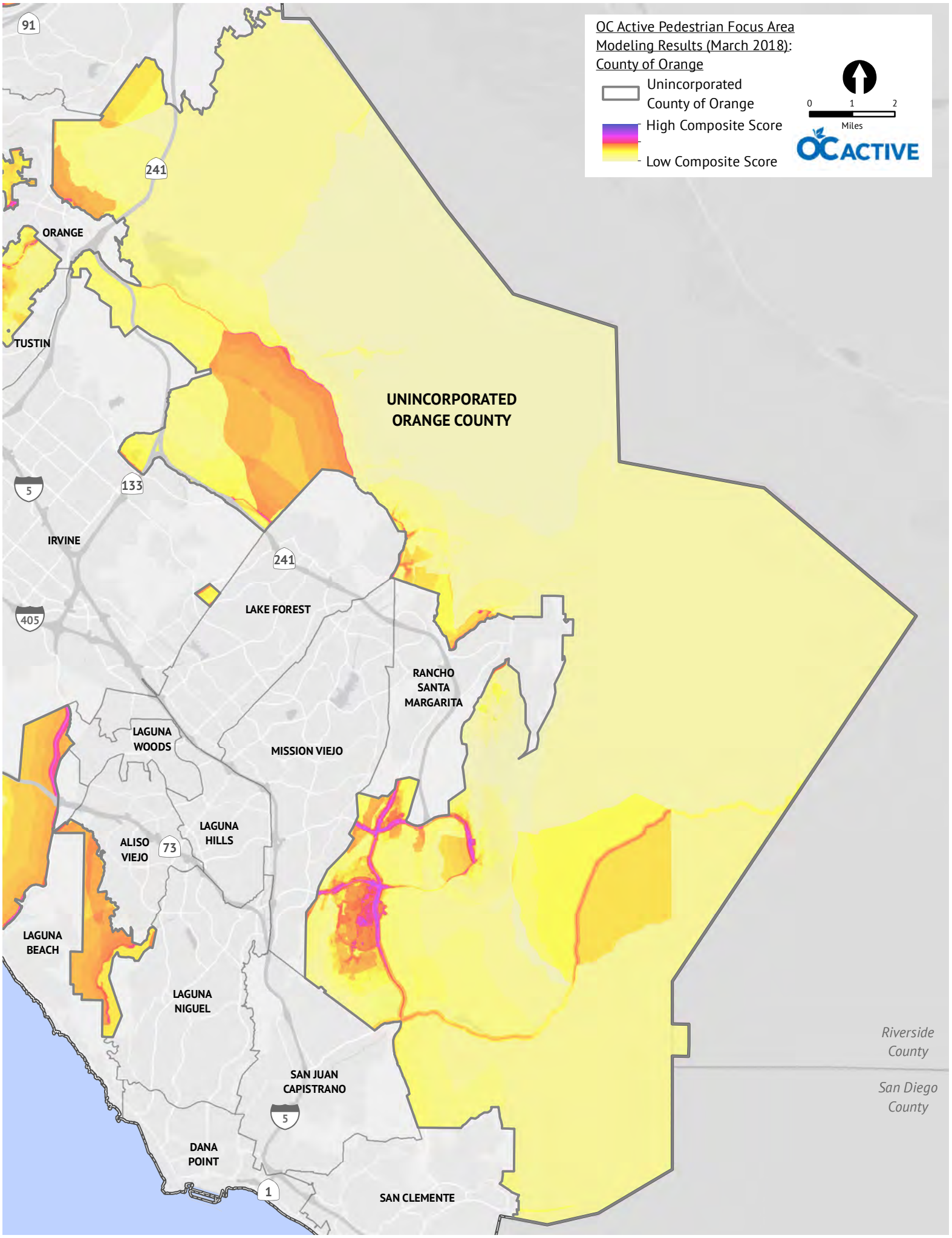

LAGUNA WOODS
LAKE FOREST
IRVINE
MISSION VIEJO
5
GLENWOOD
73
LAGUNA HILLS
COUNTY OF ORANGE
ALISO VIEJO
ALISO VIEJO
ALISO CREEK
ALICIA
LA PAZ
PACIFIC PARK
WOOD CANYON
LAGUNA BEACH
LAGUNA NIGUEL
COUNTY OF ORANGE
OC Active Pedestrian Focus Area Modeling Results (March 2018): Aliso Viejo
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE

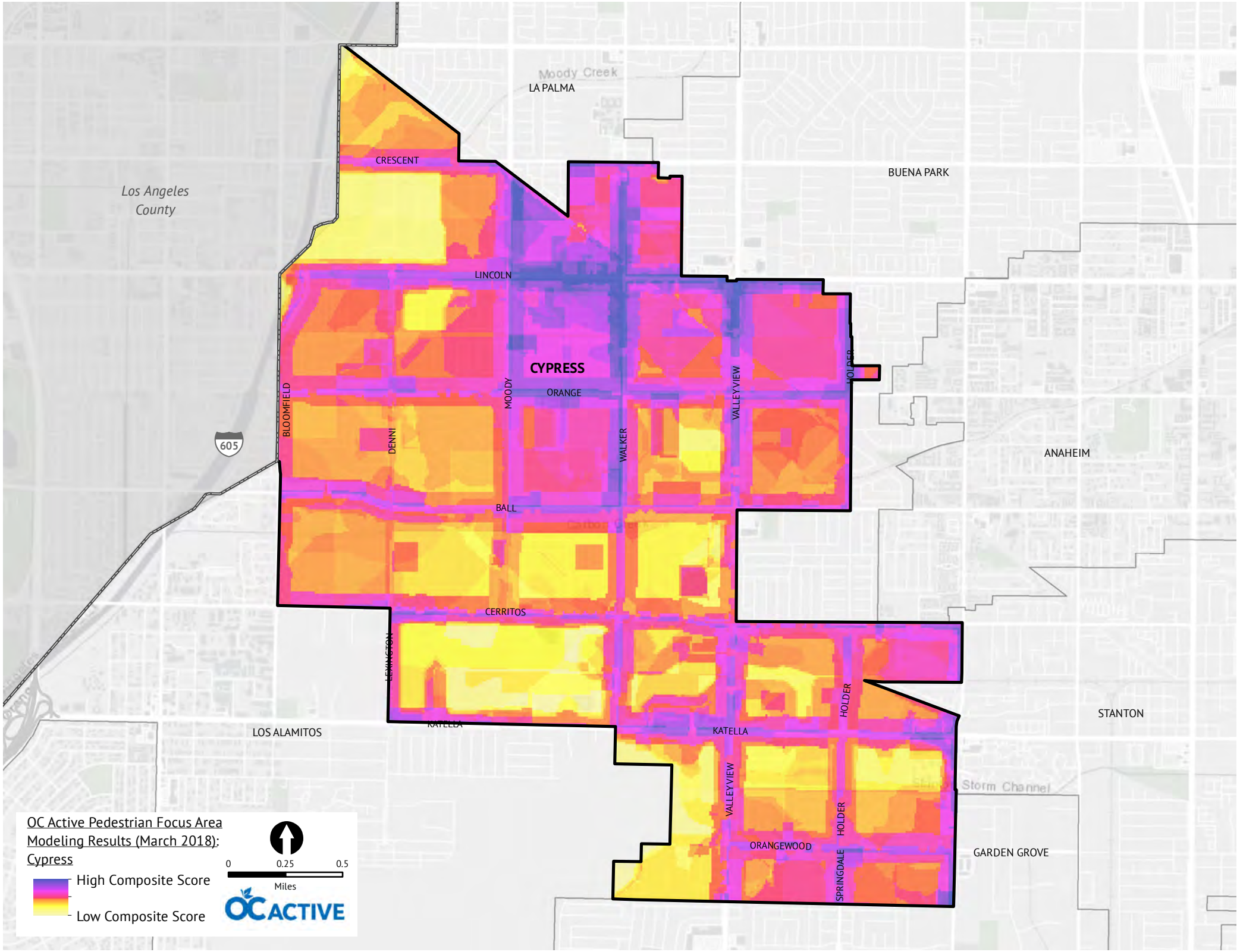

OC Active Pedestrian Focus Area Modeling Results (March 2018): Anaheim
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
1
2
Miles
OC ACTIVE
Unincorporated County of Orange
ANAHEIM
BREA
FULLERTON
PLACENTIA
YORBA LINDA
BUENA PARK
CYPRESS
STANTON
GARDEN GROVE
WESTMINSTER
HUNTINGTON BEACH
FOUNTAIN VALLEY
SANTA ANA
TUSTIN
IRVINE
VILLA PARK
ORANGE
COUNTY OF ORANGE
Los Angeles County
San Bernardino County
Riv. County
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

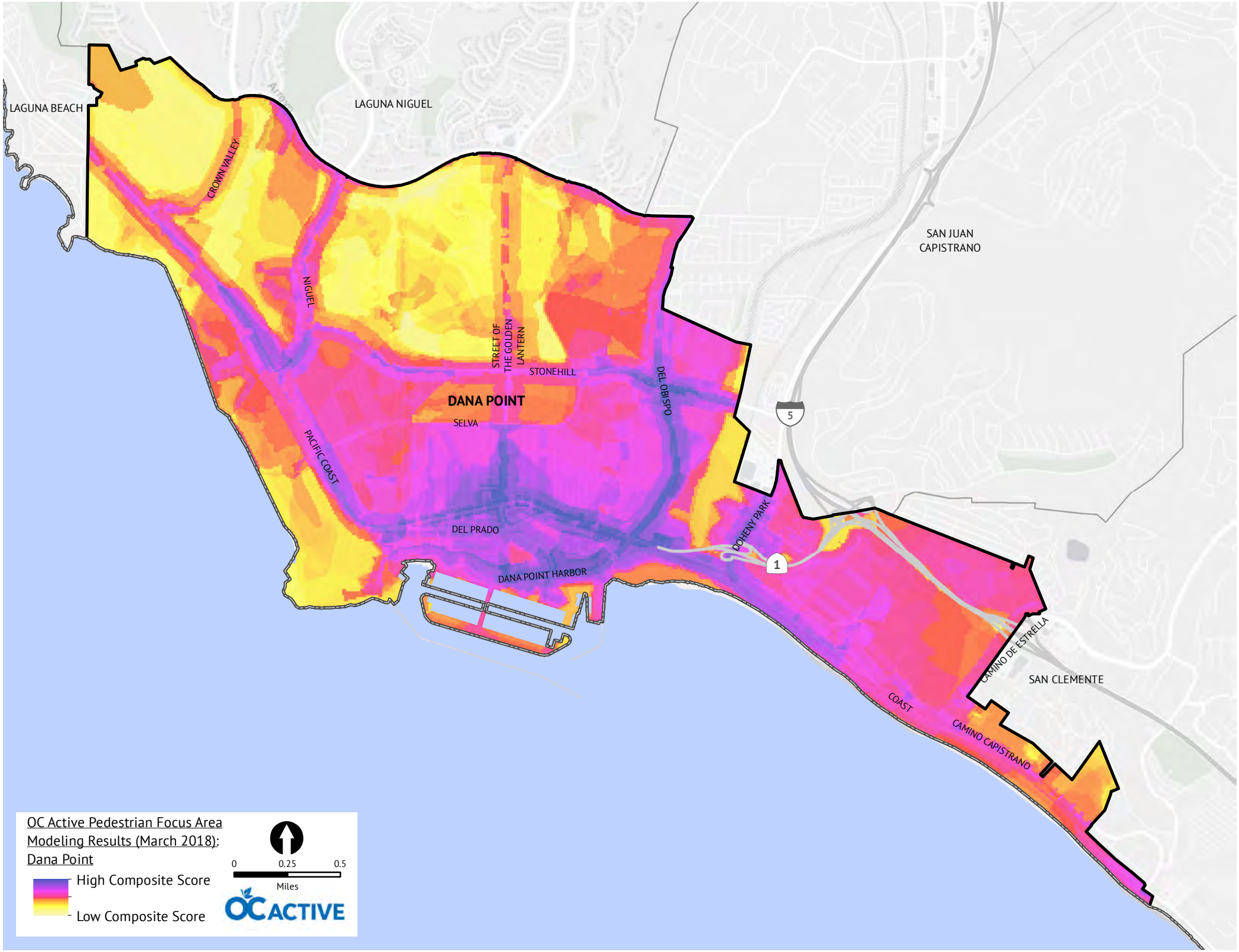

OC Active Pedestrian Focus Area Modeling Results (March 2018): Buena Park
Unincorporated County of Orange
High Composite Score
Low Composite Score
0 0.25 0.5
Miles
OCACTIVE
Unincorporated County of Orange
ROSECRANS
LA MIRADA
STAGE
KNOTT
MALVERN
Brea Creek
FULLERTON
Los Angeles County
ARTESIA
AUTO CENTER
Fullerton Municipal Airport
COMMONWEALTH
WHITAKER
DALE
ORANGETHORPE
VALLEY VIEW
WALKER
LA PALMA
KNOTT
WESTERN
STANTON
BUENA PARK
LA PALMA
DALE
BEACH
ANAHEIM
CRESCENT
LINCOLN
ORANGE
CYPRESS
Carbon Creek
BALL
HOLDER
VALLEY VIEW
CERRITOS
LOS ALAMITOS
STANTON
5
91
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

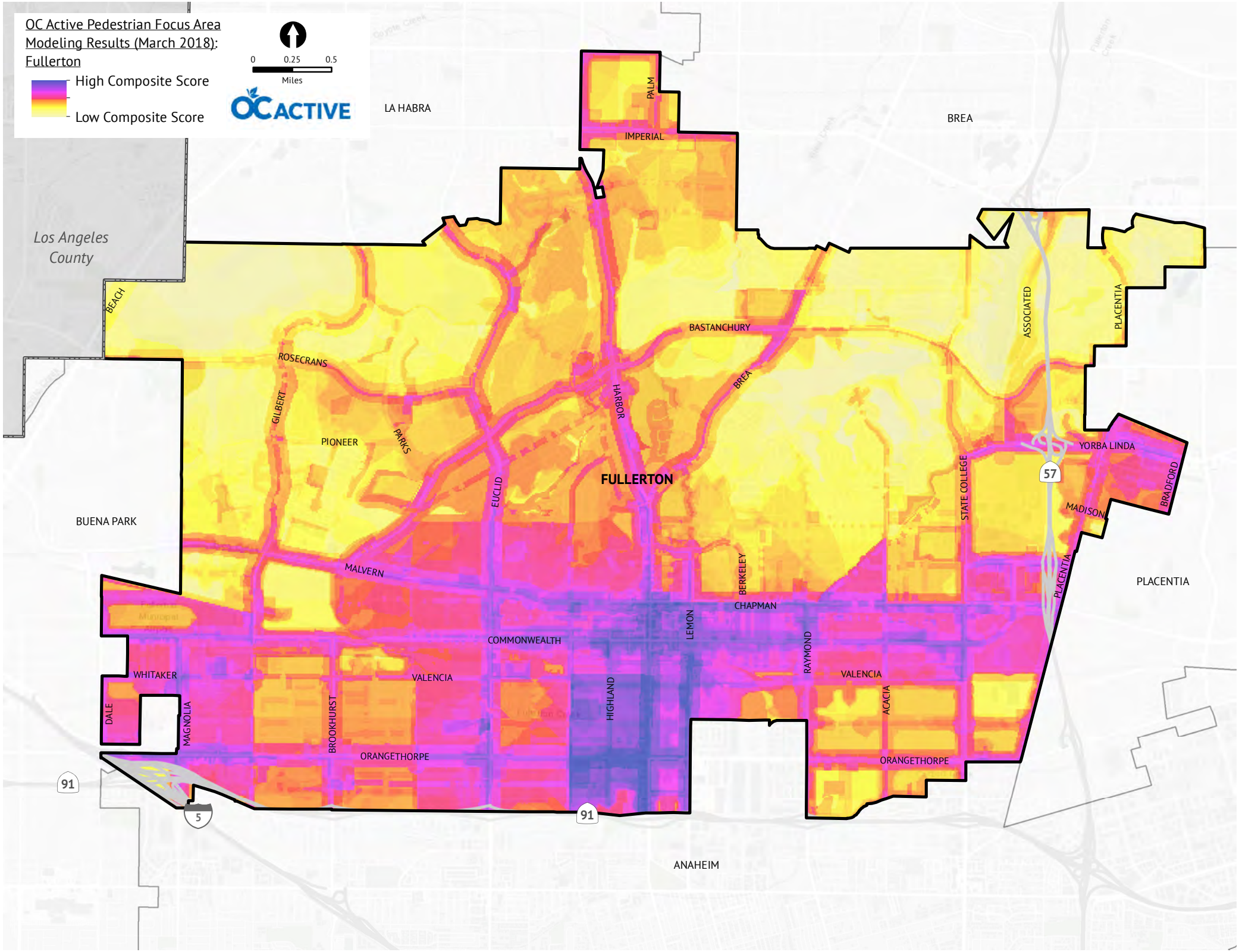

Los Angeles County
San Bernardino County
Orange
WHITTIER
LA HABRA
CENTRAL
PUENTE
BERRY
LAMBERT
BREA
STATE COLLEGE
ASSOCIATED
BIRCH
IMPERIAL
PLACENTIA
KRAEMER
VALENCIA
ROSE
CARBON CANYON
Unincorporated County of Orange
BREA
57
FULLERTON
PLACENTIA
YORBA LINDA
Carbon Canyon Creek
90
ANAHEIM
OC Active Pedestrian Focus Area Modeling Results (March 2018): Brea
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.5
1
Miles
OCACTIVE
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

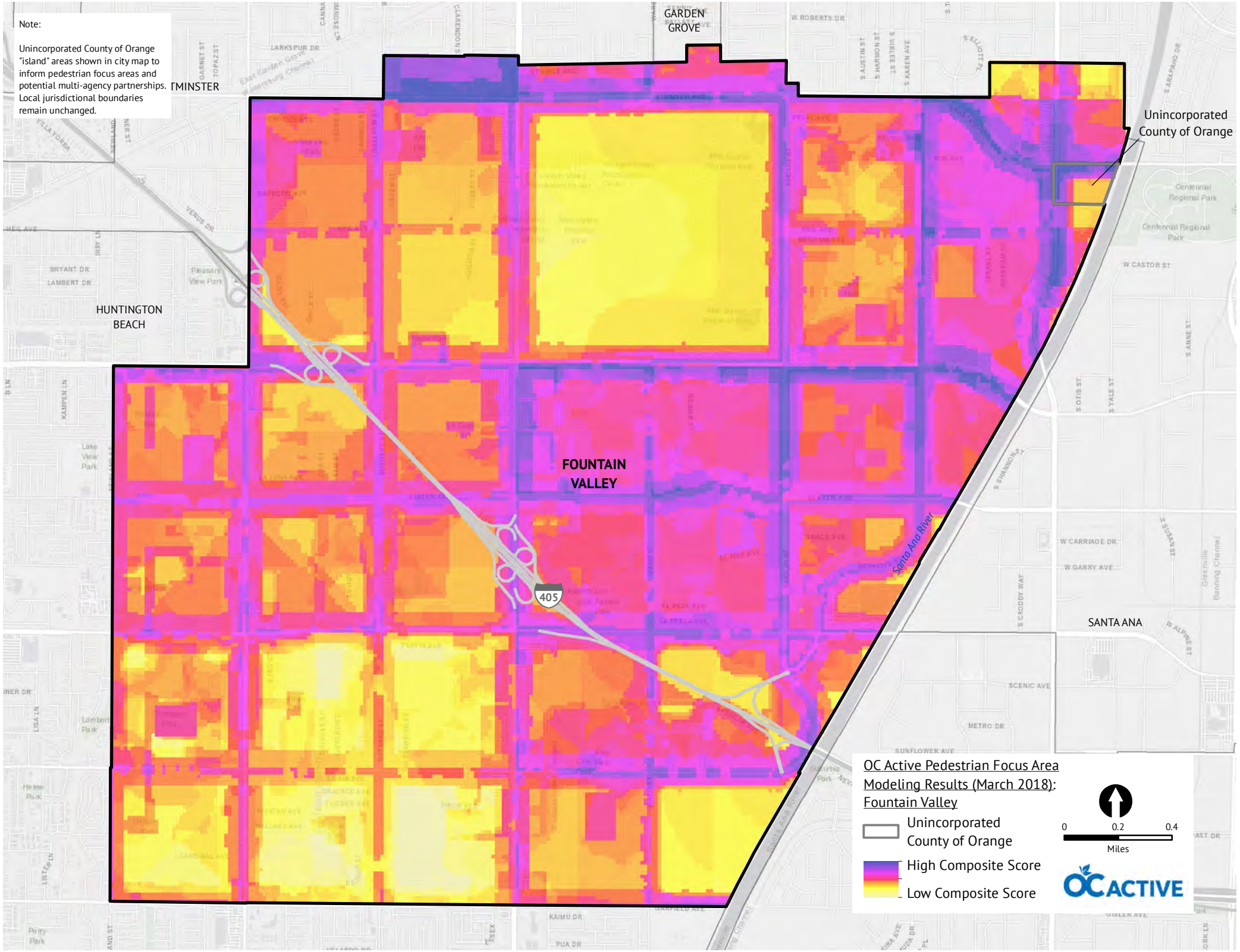

FOUNTAIN VALLEY
SANTA ANA
IRVINE
HUNTINGTON BEACH
NEWPORT BEACH
COSTA MESA
MACARTHUR
HYLAND
SUNFLOWER
SOUTH COAST
405
GISLER
BEAR
SAKIOKA
ANTON
BRISTOL
PAULARINO
BAKER
MESA VERDE
RED HILL
ADAMS
FAIRVIEW
HARBOR
MERRIMAC
ARLINGTON
FAIR
55
73
DEL MAR
SANTA ANA
NEWPORT
WILSON
PLACENTIA
VICTORIA
IRVINE
22ND
19TH
17TH
SUPERIOR
Unincorporated County of Orange
Duck Ponds
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
OC Active Pedestrian Focus Area Modeling Results (March 2018): Costa Mesa
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.3
0.6
Miles
OC ACTIVE

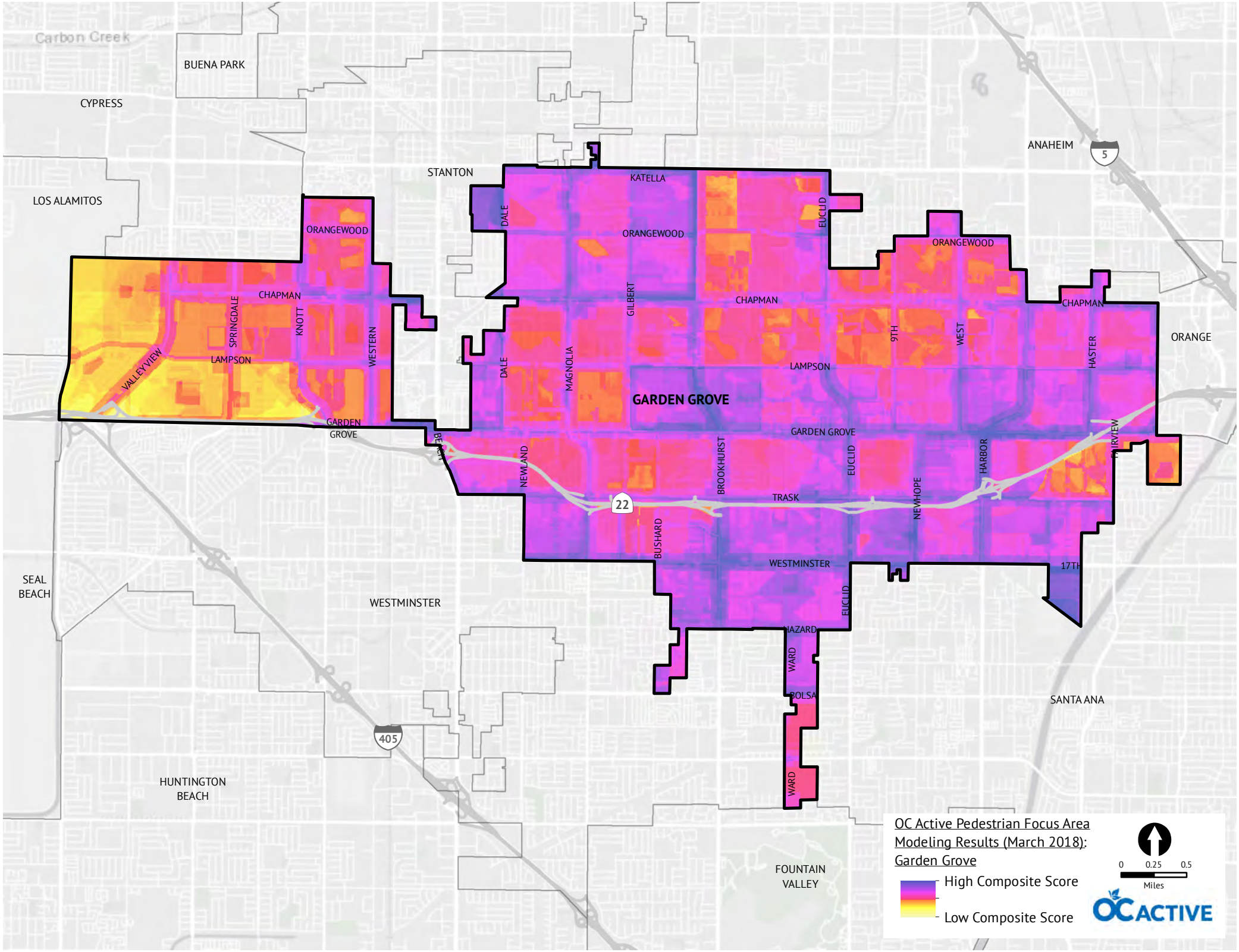

OC Active Pedestrian Focus Area
Modeling Results (March 2018):
County of Orange
Unincorporated
County of Orange
High Composite Score
Low Composite Score
0
1
2
Miles
OC ACTIVE
UNINCORPORATED
ORANGE COUNTY
ORANGE
TUSTIN
IRVINE
LAKE FOREST
RANCHO
SANTA
MARGARITA
MISSION VIEJO
LAGUNA
WOODS
LAGUNA
HILLS
ALISO
VIEJO
LAGUNA
BEACH
LAGUNA
NIGUEL
SAN JUAN
CAPISTRANO
DANA
POINT
SAN CLEMENTE
91
241
133
5
405
73
1
Riverside
County
San Diego
County

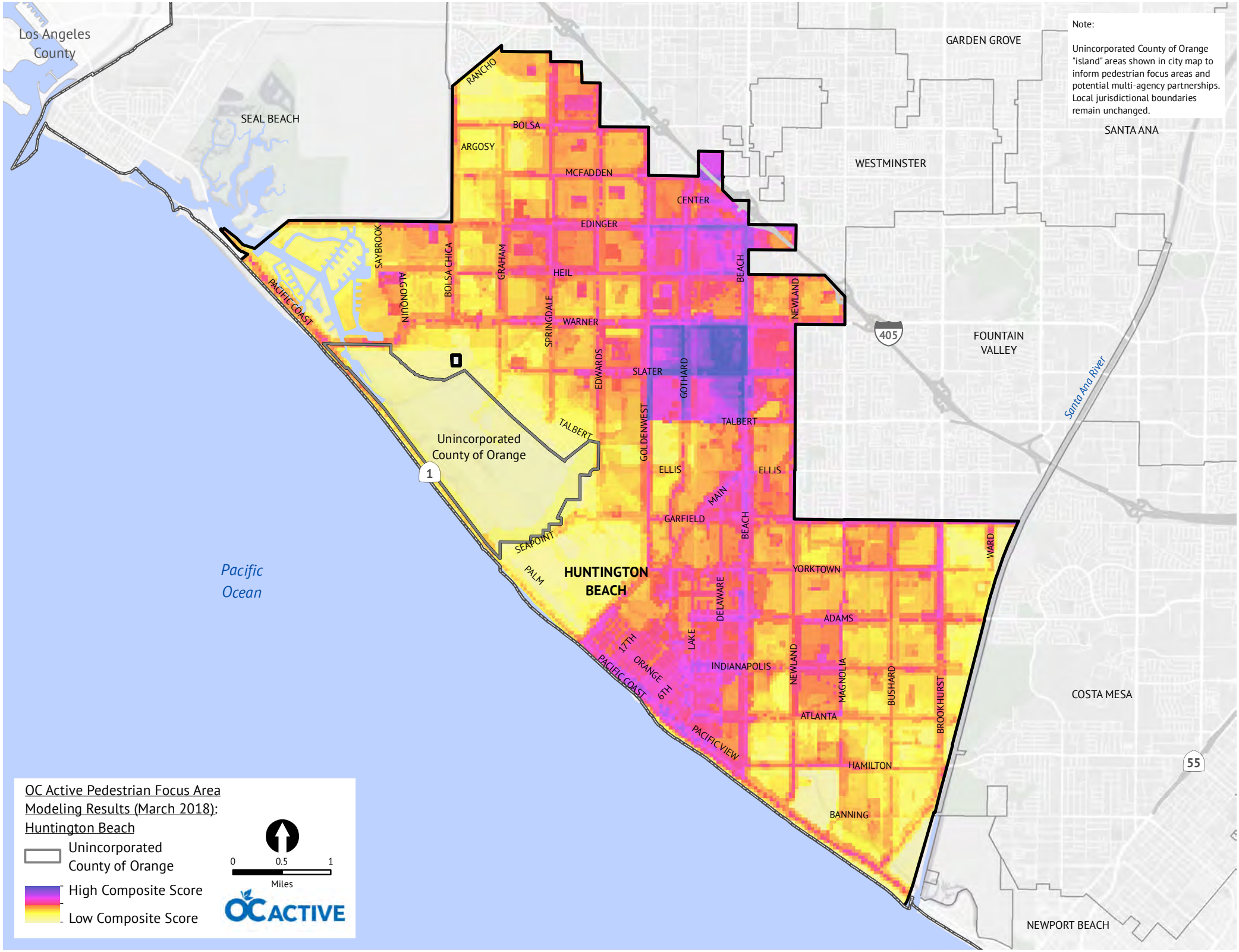

OC Active Pedestrian Focus Area Modeling Results (March 2018): Cypress
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OC ACTIVE
CYPRESS
CRESCENT
LINCOLN
ORANGE
BALL
CERRITOS
KATELLA
ORANGEWOOD
BLOOMFIELD
DENNI
MOODY
WALKER
VALLEY VIEW
HOLDER
SPRINGDALE
LEXINGTON
LA PALMA
BUENA PARK
ANAHEIM
STANTON
GARDEN GROVE
LOS ALAMITOS
Los Angeles County
605
Moody Creek
Storm Channel

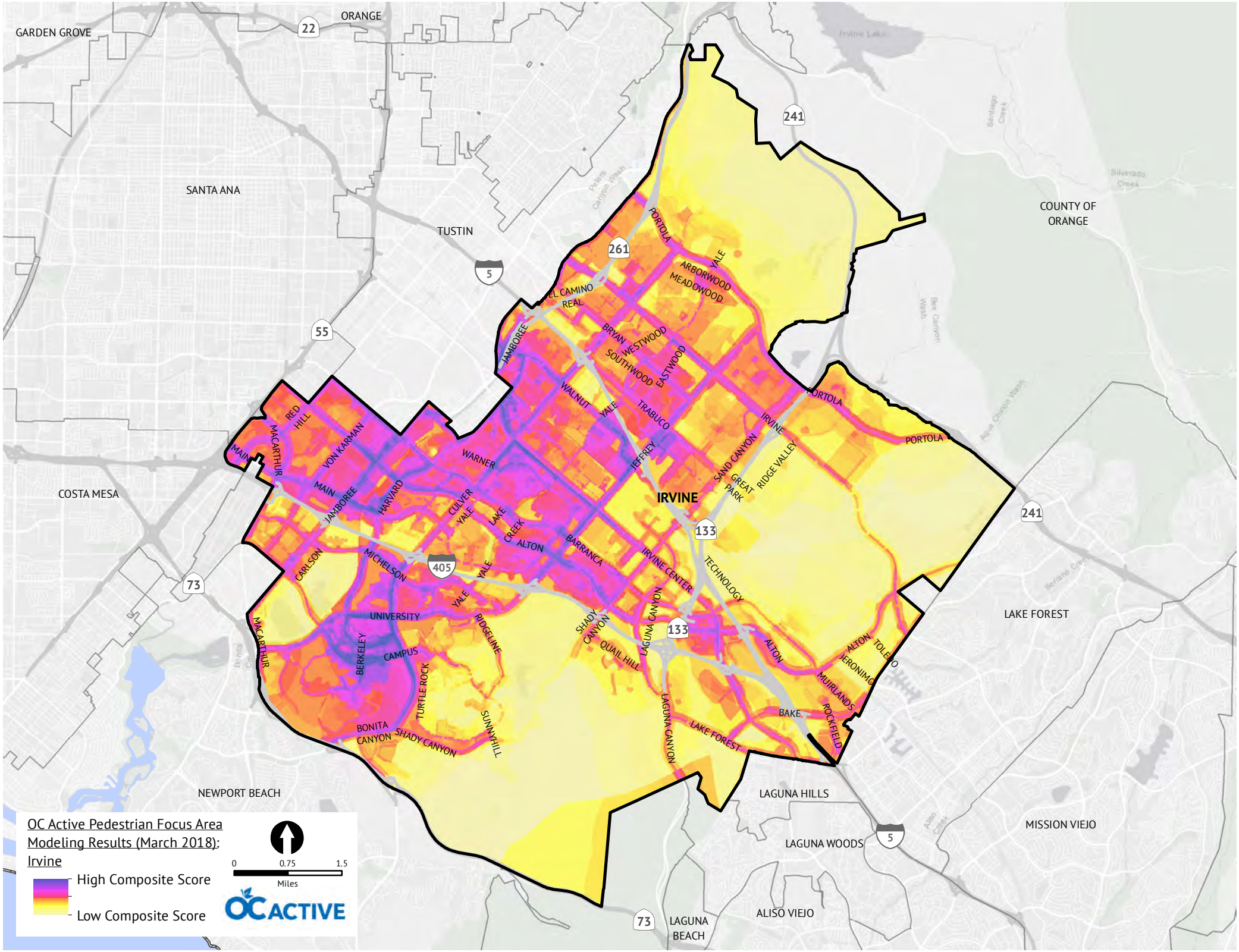

LAGUNA BEACH
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
SAN CLEMENTE
CROWN VALLEY
NIGUEL
STREET OF THE GOLDEN LANTERN
STONEHILL
DEL OBISPO
DANA POINT
SELVA
PACIFIC COAST
DEL PRADO
DANA POINT HARBOR
DOHENY PARK
CAMINO DE ESTRELLA
COAST
CAMINO CAPISTRANO
5
1
OC Active Pedestrian Focus Area Modeling Results (March 2018): Dana Point
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE

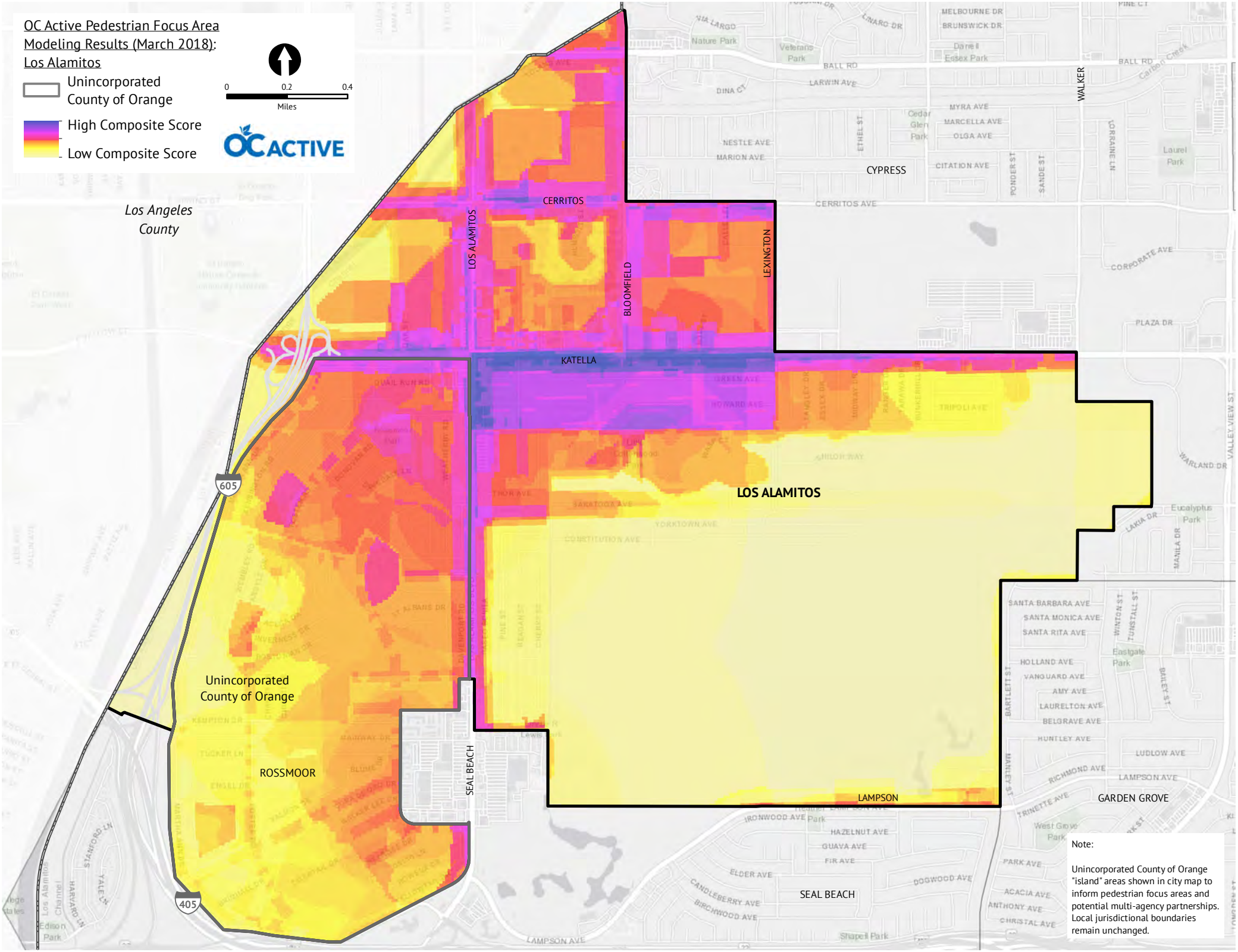

OC Active Pedestrian Focus Area Modeling Results (March 2018): Fullerton
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE
LA HABRA
BREA
IMPERIAL
PALM
Los Angeles County
BEACH
ROSECRANS
GILBERT
PIONEER
PARKS
EUCLID
HARBOR
BASTANCHURY
BREA
ASSOCIATED
PLACENTIA
YORBA LINDA
BRADFORD
MADISON
STATE COLLEGE
FULLERTON
BUENA PARK
MALVERN
BERKELEY
CHAPMAN
LEMON
RAYMOND
PLACENTIA
COMMONWEALTH
WHITAKER
VALENCIA
DALE
MAGNOLIA
BROOKHURST
HIGHLAND
ACACIA
ORANGETHORPE
91
5
57
ANAHEIM

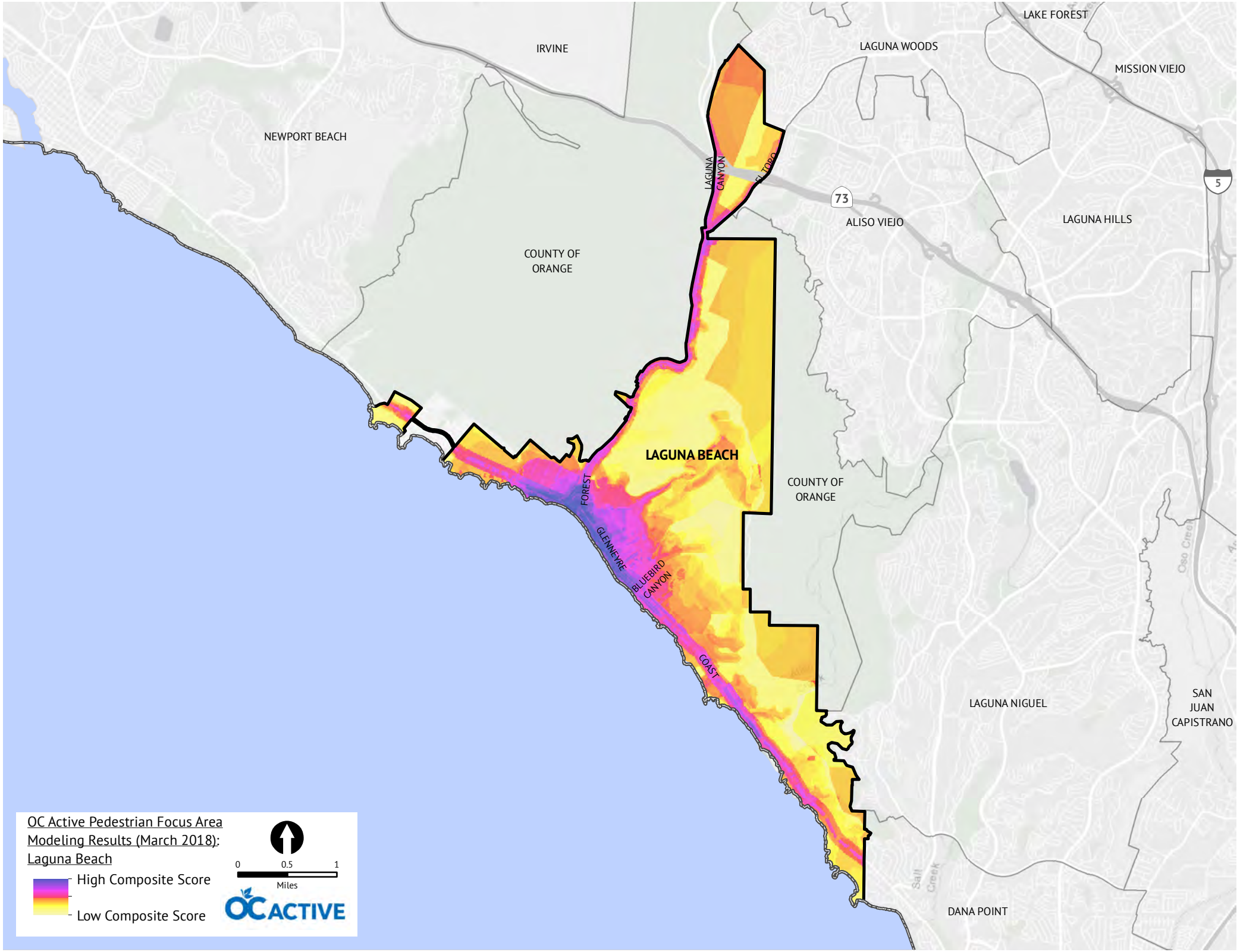

Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
GARDEN GROVE
TMINSTER
HUNTINGTON BEACH
FOUNTAIN VALLEY
SANTA ANA
Unincorporated County of Orange
405
Santa Ana River
OC Active Pedestrian Focus Area Modeling Results (March 2018): Fountain Valley
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.2
0.4
Miles
OCACTIVE

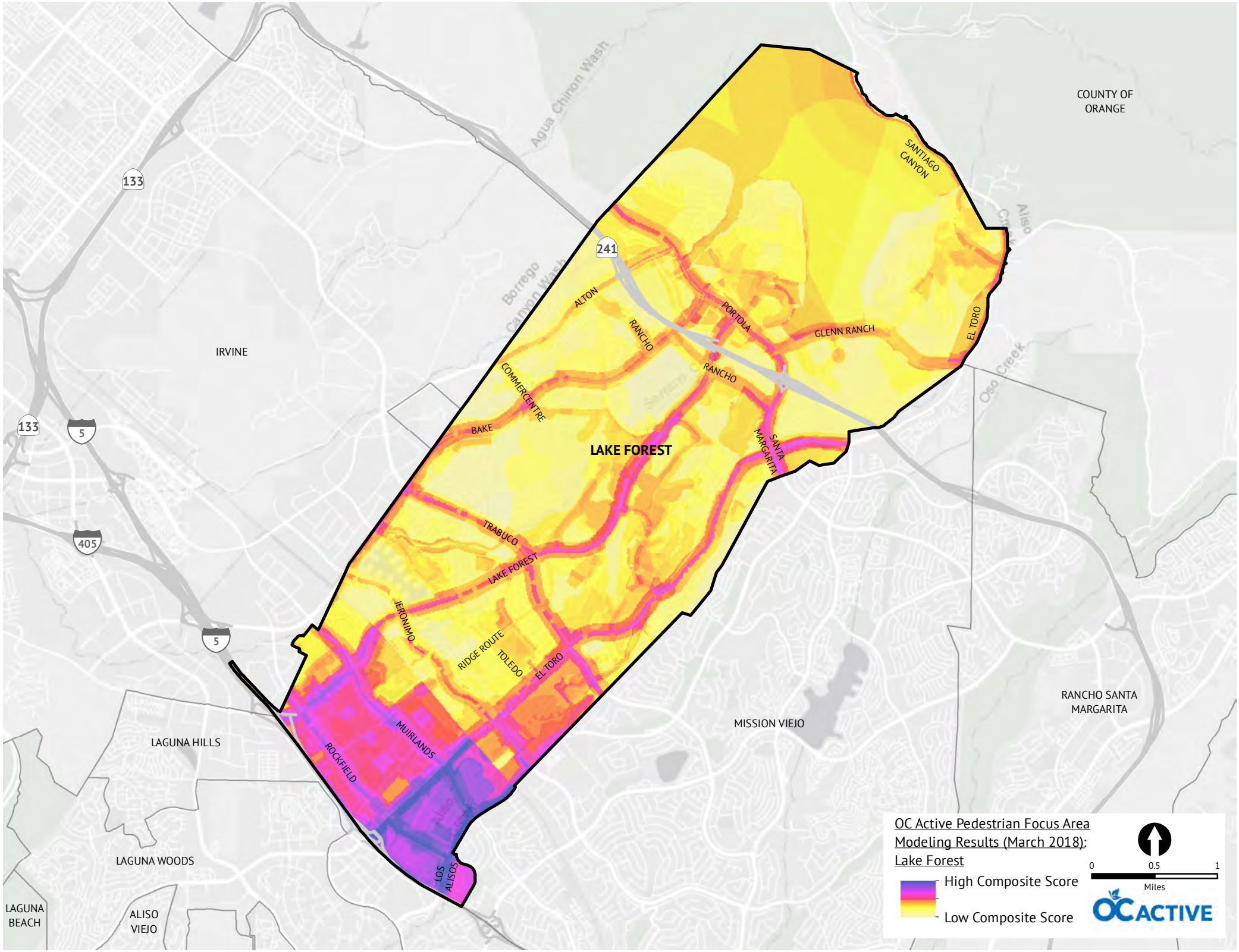

Carbon Creek
BUENA PARK
CYPRESS
LOS ALAMITOS
STANTON
ANAHEIM
5
KATELLA
DALE
ORANGEWOOD
EUCLID
CHAPMAN
GILBERT
9TH
WEST
HASTER
ORANGE
LAMPSON
MAGNOLIA
GARDEN GROVE
SPRINGDALE
KNOTT
WESTERN
VALLEY VIEW
BEACH
NEWLAND
BROOKHURST
HARBOR
FAIRVIEW
22
TRASK
NEWHOPE
BUSHARD
WESTMINSTER
17TH
SEAL BEACH
HAZARD
WARD
BOLSA
SANTA ANA
405
HUNTINGTON BEACH
FOUNTAIN VALLEY
OC Active Pedestrian Focus Area Modeling Results (March 2018): Garden Grove
High Composite Score
Low Composite Score
0 0.25 0.5
Miles
OCACTIVE

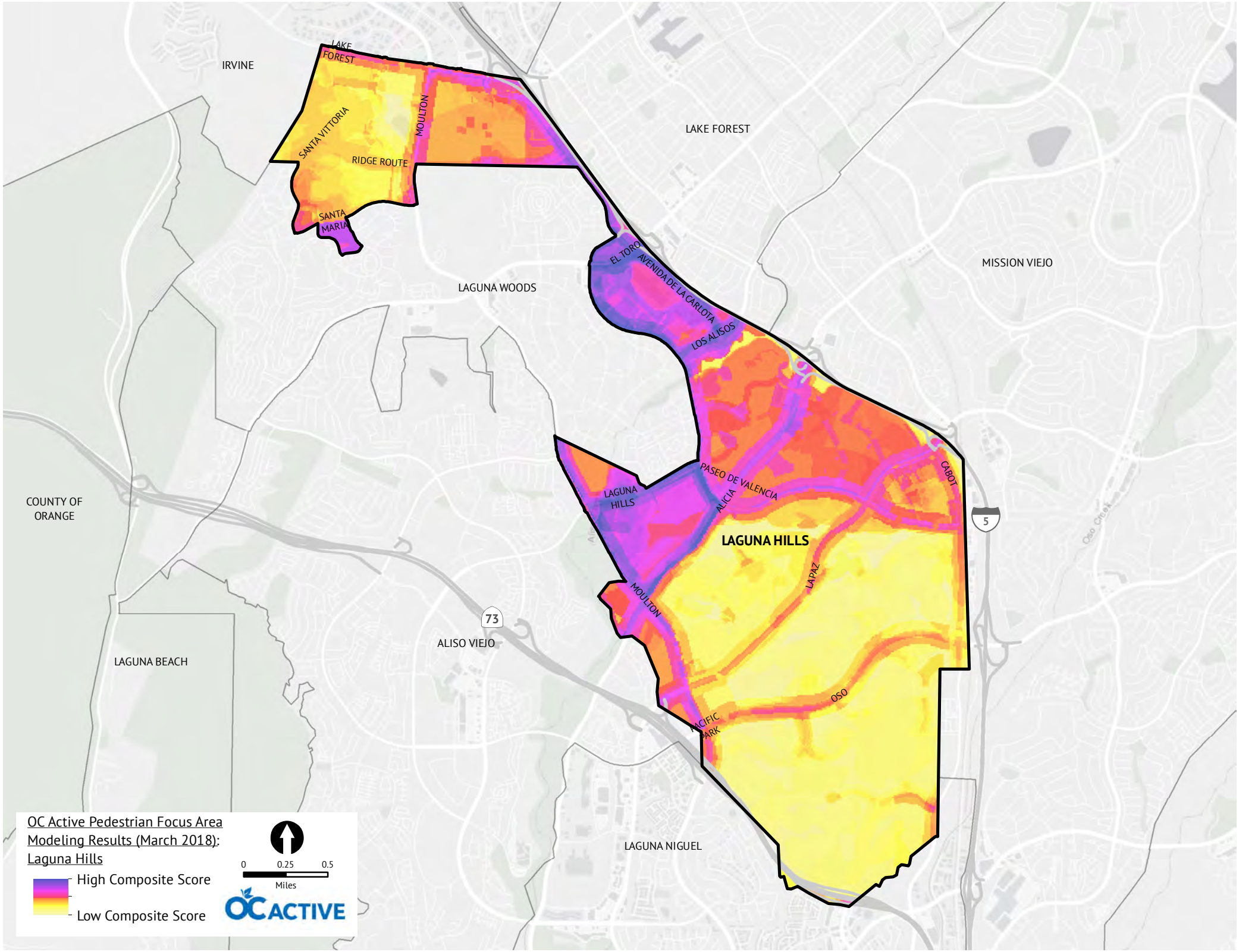

Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
Los Angeles County
SEAL BEACH
GARDEN GROVE
SANTA ANA
WESTMINSTER
FOUNTAIN VALLEY
COSTA MESA
NEWPORT BEACH
Pacific Ocean
Santa Ana River
Unincorporated County of Orange
HUNTINGTON BEACH
RANCHO
BOLSA
ARGOSY
MCFADDEN
CENTER
EDINGER
SAYBROOK
ALGONQUIN
BOLSA CHICA
GRAHAM
HEIL
BEACH
NEWLAND
SPRINGDALE
WARNER
EDWARDS
SLATER
GOTHARD
GOLDENWEST
TALBERT
ELLIS
MAIN
GARFIELD
SEAPOINT
PALM
YORKTOWN
WARD
DELAWARE
ADAMS
LAKE
17TH
ORANGE
6TH
INDIANAPOLIS
MAGNOLIA
BUSHARD
BROOKHURST
ATLANTA
HAMILTON
BANNING
PACIFIC COAST
PACIFIC VIEW
405
1
55
OC Active Pedestrian Focus Area Modeling Results (March 2018): Huntington Beach
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.5
1
Miles
OCACTIVE

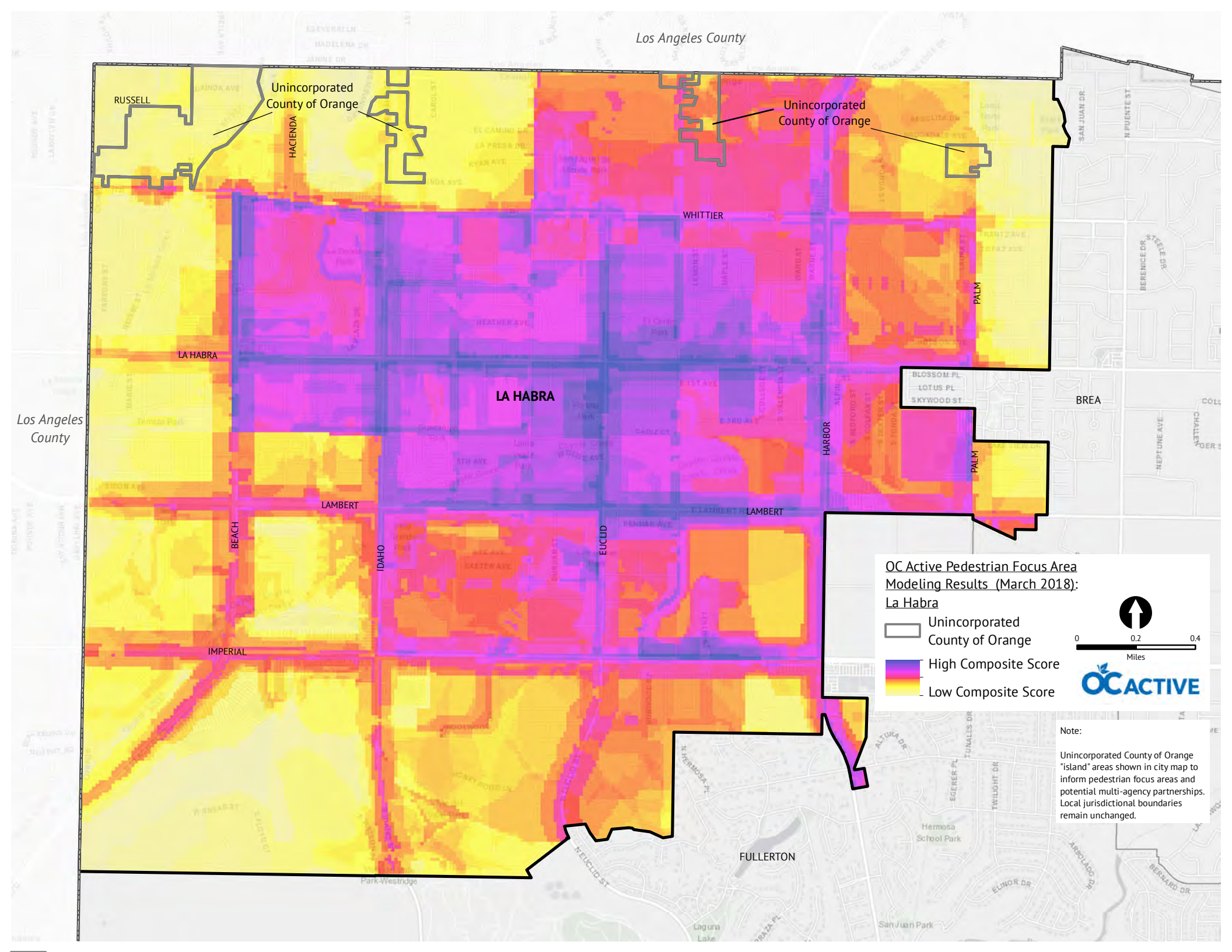

GARDEN GROVE
ORANGE
22
SANTA ANA
TUSTIN
5
55
261
241
COUNTY OF ORANGE
COSTA MESA
IRVINE
133
405
73
LAKE FOREST
NEWPORT BEACH
LAGUNA HILLS
LAGUNA WOODS
MISSION VIEJO
LAGUNA BEACH
ALISO VIEJO
PORTOLA
YALE
ARBORWOOD
MEADOWOOD
EL CAMINO REAL
JAMBOREE
BRYAN
WESTWOOD
SOUTHWOOD
EASTWOOD
WALNUT
TRABUCO
IRVINE
SAND CANYON
GREAT PARK
RIDGE VALLEY
RED HILL
MACARTHUR
VON KARMAN
MAIN
WARNER
JEFFREY
HARVARD
CULVER
LAKE
CREEK
ALTON
BARRANCA
IRVINE CENTER
TECHNOLOGY
CARLSON
MICHELSON
UNIVERSITY
BERKELEY
CAMPUS
RIDGELINE
TURTLE ROCK
BONITA CANYON
SHADY CANYON
SUNNYHILL
QUAIL HILL
LAGUNA CANYON
TOLEDO
JERONIMO
MUIRLANDS
ROCKFIELD
BAKE
OC Active Pedestrian Focus Area Modeling Results (March 2018): Irvine
High Composite Score
Low Composite Score
0
0.75
1.5
Miles
OCACTIVE

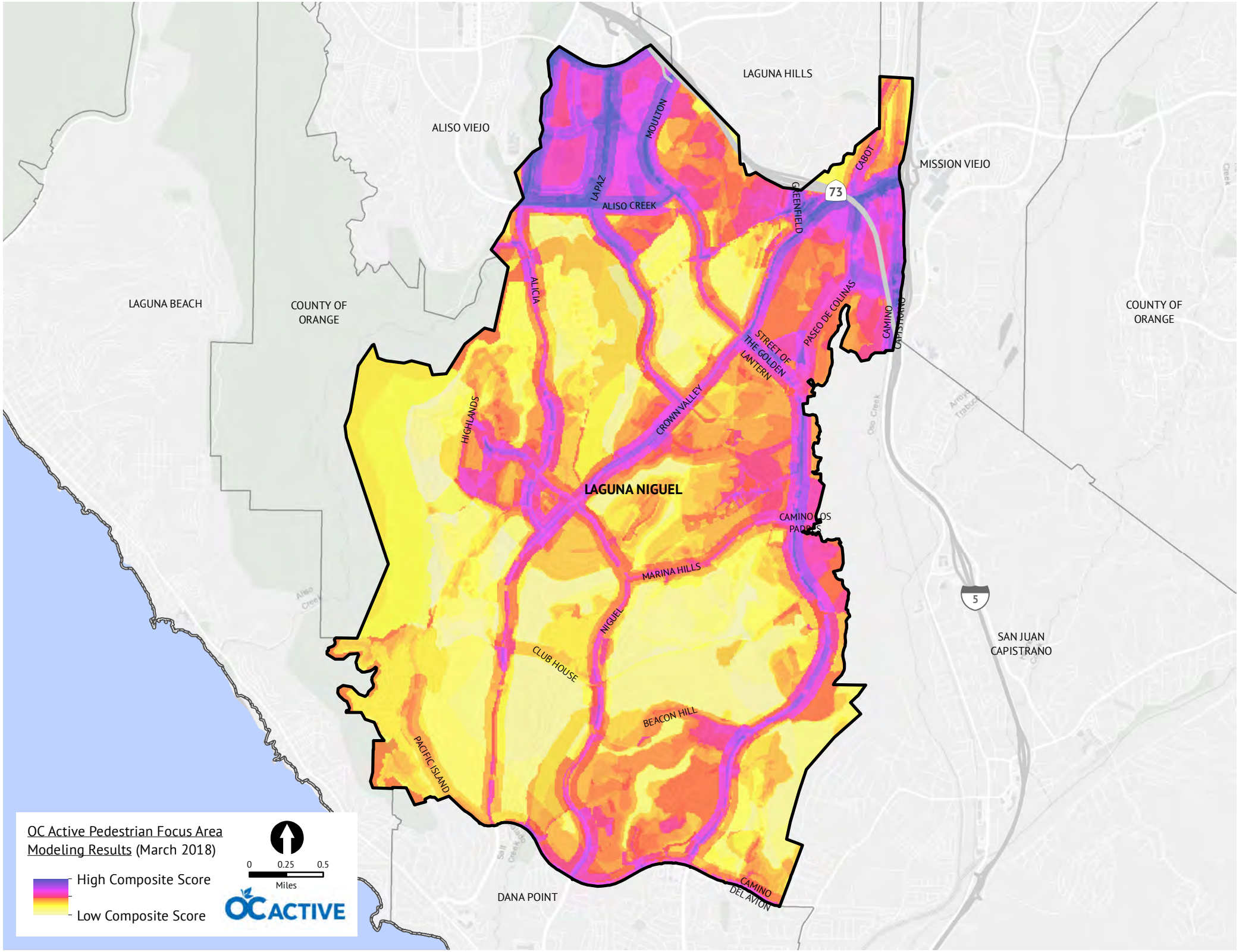

OC Active Pedestrian Focus Area Modeling Results (March 2018): Los Alamitos
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.2
0.4
Miles
OC ACTIVE
Los Angeles County
CERRITOS
LOS ALAMITOS
BLOOMFIELD
LEXINGTON
KATELLA
CYPRESS
LOS ALAMITOS
Unincorporated County of Orange
ROSSMOOR
SEAL BEACH
LAMPSON
GARDEN GROVE
605
405
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

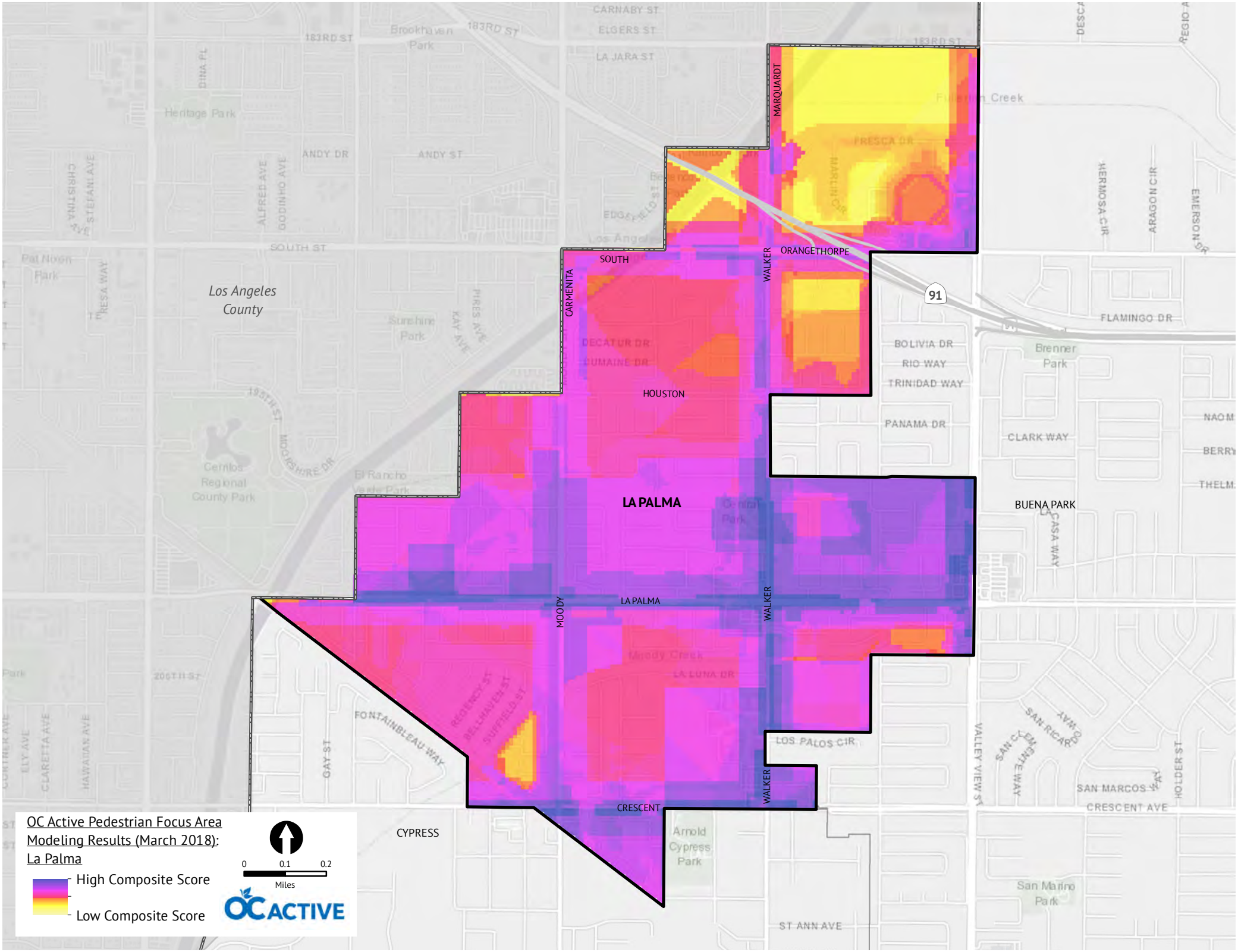

LAKE FOREST
IRVINE
LAGUNA WOODS
MISSION VIEJO
NEWPORT BEACH
LAGUNA CANYON
EL TORO
73
5
ALISO VIEJO
LAGUNA HILLS
COUNTY OF ORANGE
LAGUNA BEACH
COUNTY OF ORANGE
FOREST
GLENNEYRE
BLUEBIRD CANYON
COAST
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
Oso Creek
Salt Creek
DANA POINT
OC Active Pedestrian Focus Area Modeling Results (March 2018): Laguna Beach
High Composite Score
Low Composite Score
0
0.5
1
Miles
OC ACTIVE

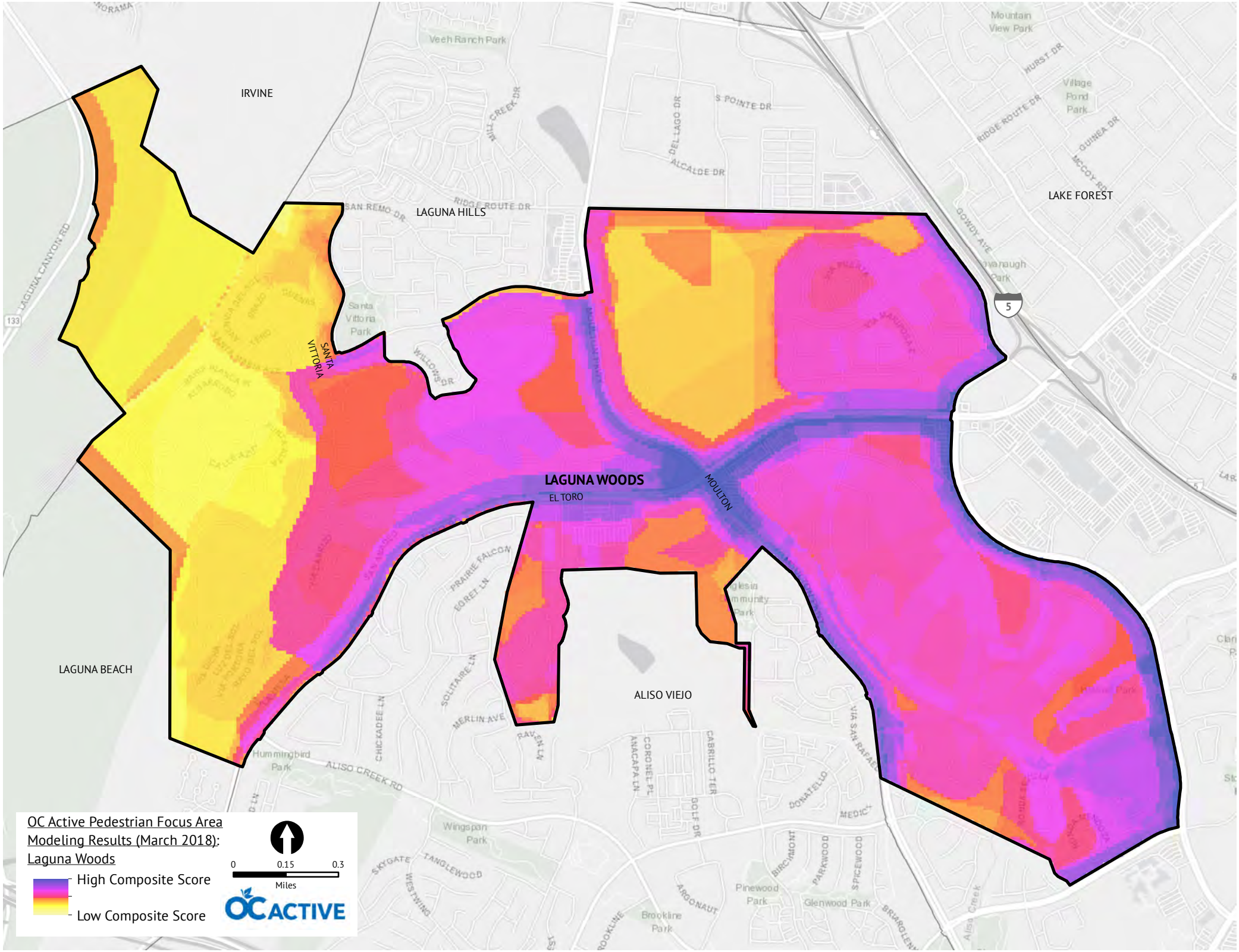

COUNTY OF ORANGE
IRVINE
LAKE FOREST
MISSION VIEJO
RANCHO SANTA MARGARITA
LAGUNA HILLS
LAGUNA WOODS
LAGUNA BEACH
ALISO VIEJO
SANTIAGO CANYON
ALTON
PORTOLA
GLENN RANCH
EL TORO
RANCHO
COMMERCENTRE
BAKE
SANTA MARGARITA
TRABUCO
LAKE FOREST
JERONIMO
RIDGE ROUTE
TOLEDO
EL TORO
MUIRLANDS
ROCKFIELD
LOS ALISOS
Agua Chinon Wash
Borrego Canyon Wash
Aliso Creek
Oso Creek
133
241
5
405
OC Active Pedestrian Focus Area Modeling Results (March 2018): Lake Forest
High Composite Score
Low Composite Score
0
0.5
1
Miles
OCACTIVE

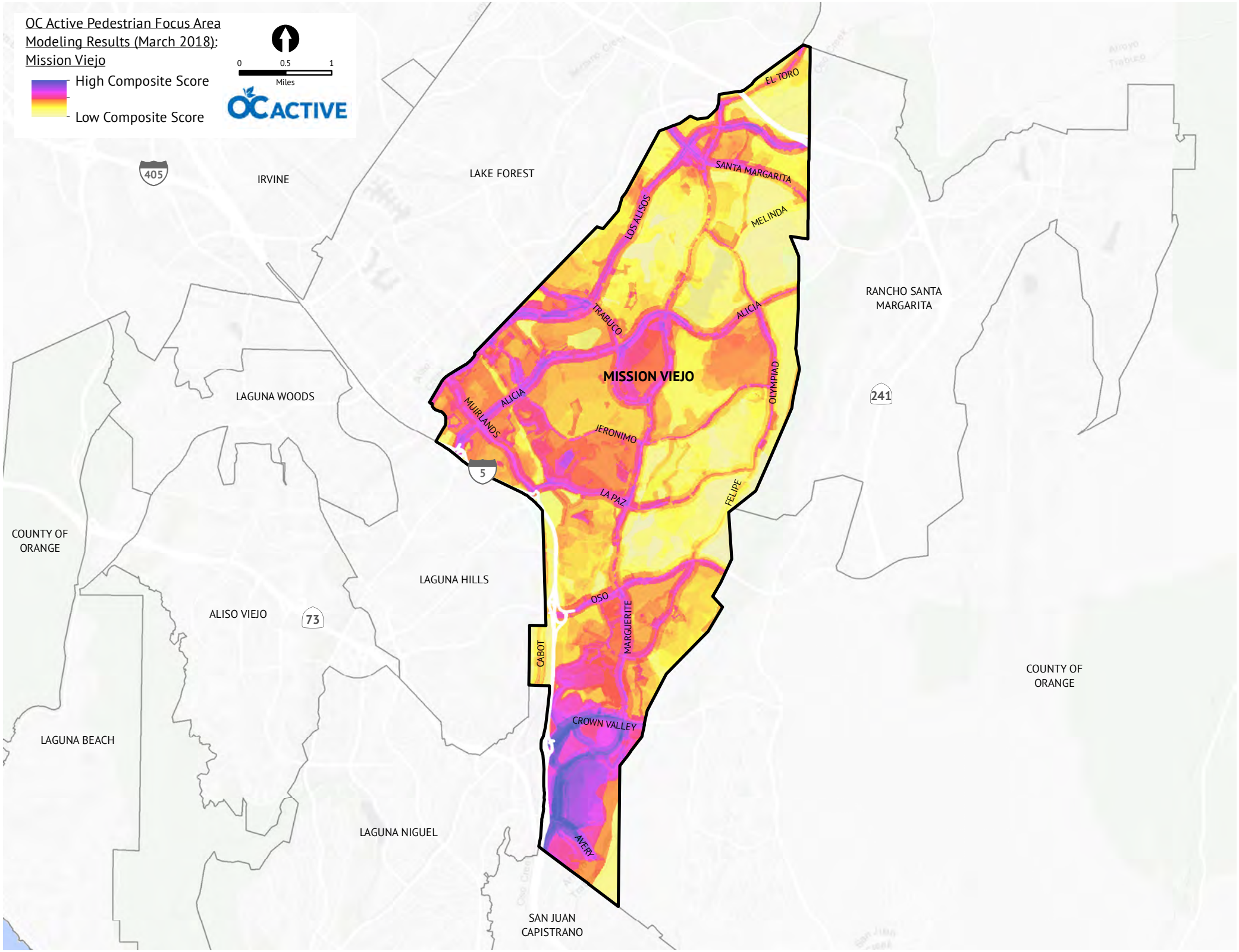

IRVINE
LAKE FOREST
SANTA VITTORIA
MOULTON
RIDGE ROUTE
SANTA MARIA
LAKE FOREST
LAGUNA WOODS
MISSION VIEJO
EL TORO
AVENIDA DE LA CARLOTA
LOS ALISOS
PASEO DE VALENCIA
ALICIA
CABOT
LAGUNA HILLS
LAGUNA HILLS
LAPAZ
MOULTON
OSO
PACIFIC PARK
COUNTY OF ORANGE
LAGUNA BEACH
ALISO VIEJO
LAGUNA NIGUEL
73
5
Oso Creek
OC Active Pedestrian Focus Area Modeling Results (March 2018): Laguna Hills
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE

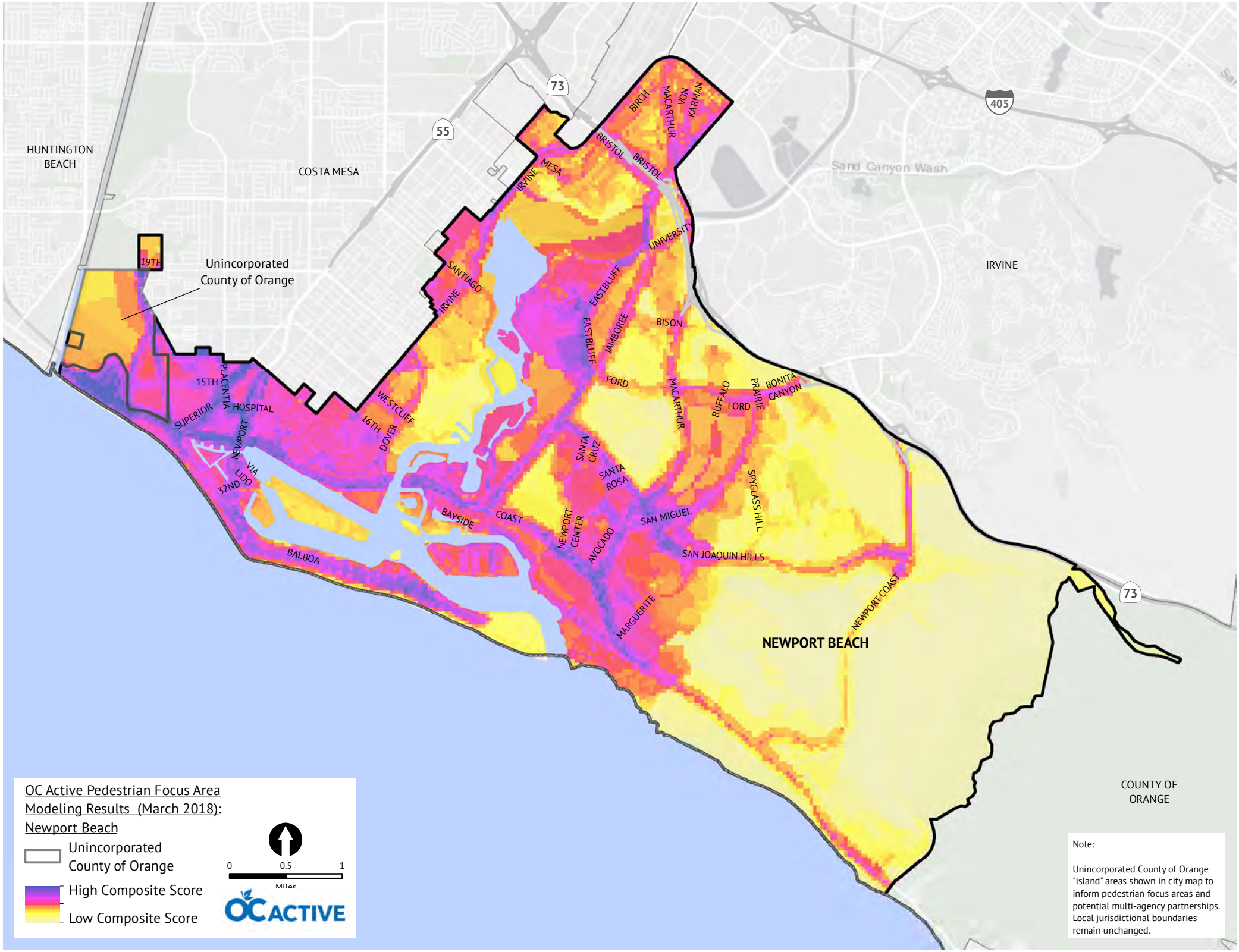

Los Angeles County
RUSSELL
Unincorporated County of Orange
HACIENDA
Unincorporated County of Orange
WHITTIER
PALM
LA HABRA
LA HABRA
BLOSSOM PL
LOTUS PL
SKYWOOD ST
BREA
Los Angeles County
HARBOR
PALM
LAMBERT
LAMBERT
BEACH
IDAHO
EUCLID
IMPERIAL
FULLERTON
Hermosa School Park
San Juan Park
OC Active Pedestrian Focus Area Modeling Results (March 2018): La Habra
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.2
0.4
Miles
OC ACTIVE
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

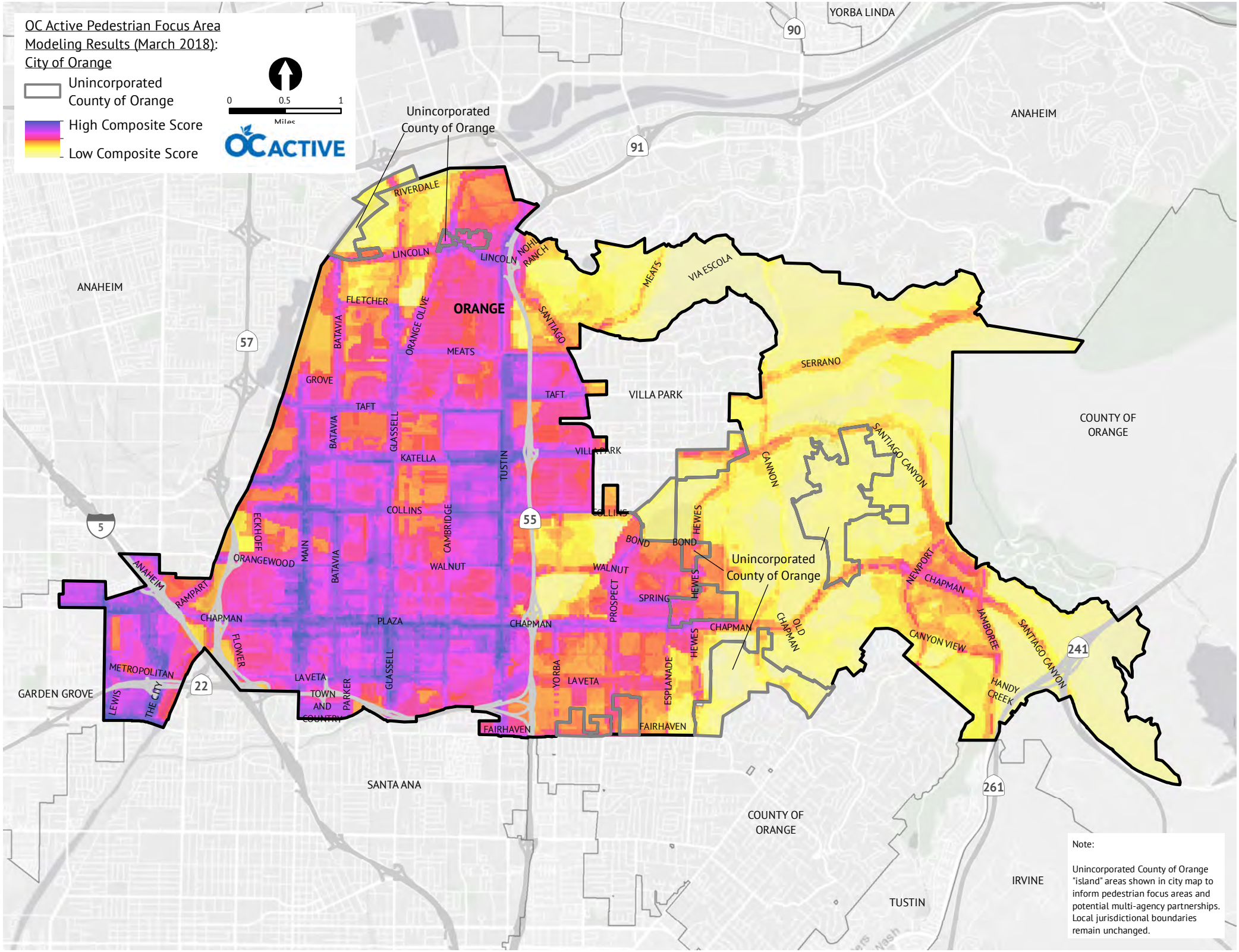

LAGUNA HILLS
ALISO VIEJO
MISSION VIEJO
LAGUNA BEACH
COUNTY OF ORANGE
COUNTY OF ORANGE
LAGUNA NIGUEL
DANA POINT
SAN JUAN CAPISTRANO
MOULTON
LAPAZ
ALISO CREEK
GREENFIELD
CABOT
ALICIA
PASEO DE COLINAS
CAMINO CAPISTRANO
STREET OF THE GOLDEN LANTERN
CROWN VALLEY
HIGHLANDS
CAMINO LOS PADRES
MARINA HILLS
NIGUEL
CLUB HOUSE
BEACON HILL
PACIFIC ISLAND
CAMINO DEL AVION
73
5
OC Active Pedestrian Focus Area Modeling Results (March 2018)
High Composite Score
Low Composite Score
0 0.25 0.5
Miles
OCACTIVE


OC Active Pedestrian Focus Area Modeling Results (March 2018): La Palma
High Composite Score
Low Composite Score
0
0.1
0.2
Miles
OCACTIVE
LA PALMA
BUENA PARK
CYPRESS
Los Angeles County
HOUSTON
SOUTH
ORANGETHORPE
LA PALMA
CRESCENT
MARQUARDT
CARMENITA
WALKER
MOODY
91
Brookhaven Park
Heritage Park
Pat Nixon Park
Sunshine Park
Cerritos Regional County Park
Brenner Park
Central Park
Arnold Cypress Park
San Marino Park
Fullerton Creek
Moody Creek
183RD ST
ANDY DR
ANDY ST
SOUTH ST
DECATUR DR
LEMAIRE DR
FLAMINGO DR
BOLIVIA DR
RIO WAY
TRINIDAD WAY
PANAMA DR
CLARK WAY
LA CASA WAY
FRESCA DR
HERMOSA CIR
ARAGON CIR
EMERSON
LA LUNA DR
LOS PALOS CIR
SAN MARCOS AVE
CRESCENT AVE
ST ANN AVE
FONTAINBLEAU WAY
GAY ST
VALLEY VIEW ST
HOLDER ST


IRVINE
LAGUNA HILLS
LAKE FOREST
LAGUNA BEACH
ALISO VIEJO
LAGUNA WOODS
EL TORO
SANTA VITTORIA
MOULTON
ALISO CREEK RD
Veeh Ranch Park
Mountain View Park
Village Pond Park
Santa Vittoria Park
Hummingbird Park
Wingspan Park
Pinewood Park
Glenwood Park
Brookline Park
OC Active Pedestrian Focus Area Modeling Results (March 2018): Laguna Woods
High Composite Score
Low Composite Score
0
0.15
0.3
Miles
OC ACTIVE

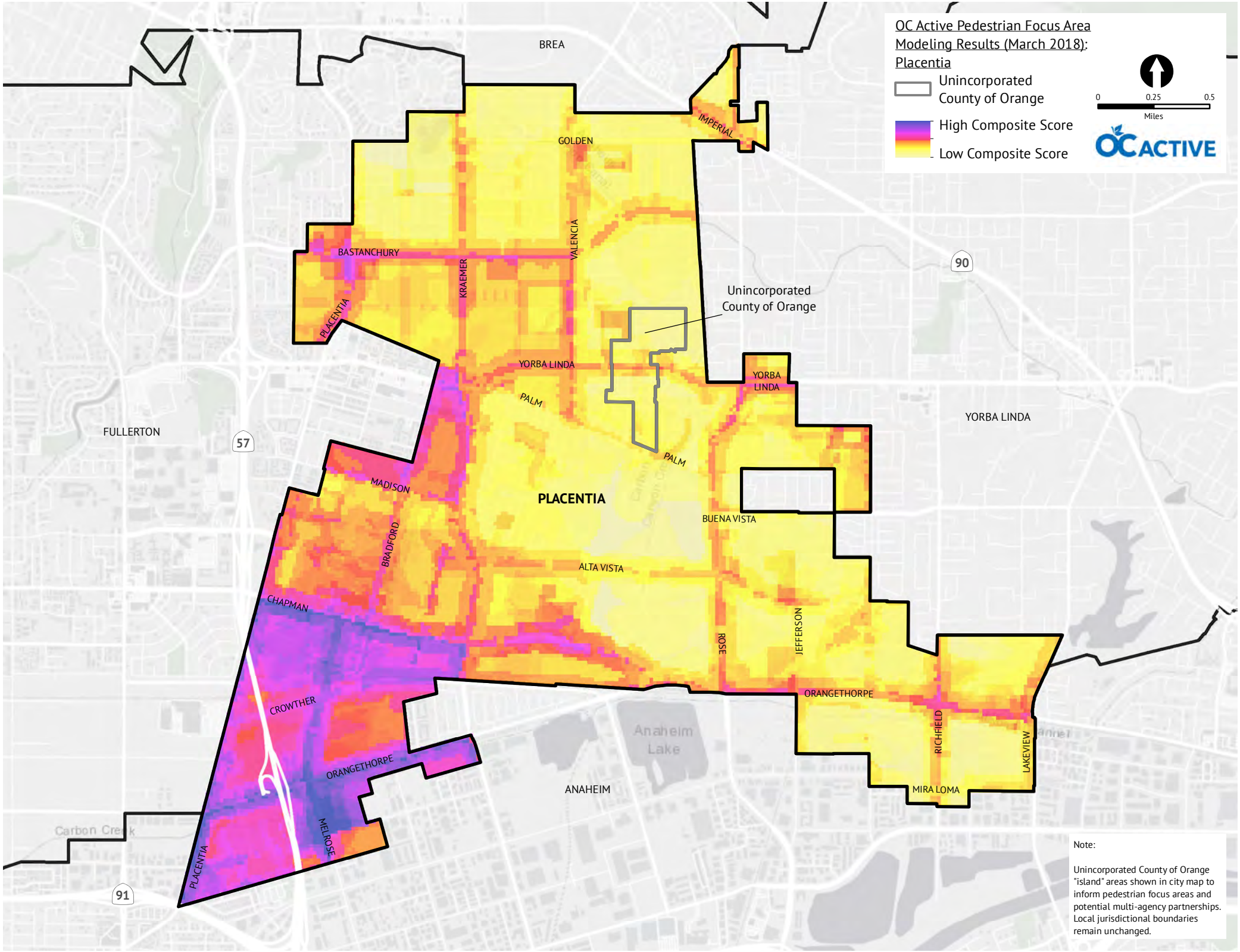

OC Active Pedestrian Focus Area Modeling Results (March 2018): Mission Viejo
High Composite Score
Low Composite Score
0
0.5
1
Miles
OCACTIVE
405
IRVINE
LAKE FOREST
SANTA MARGARITA
EL TORO
LOS ALISOS
MELINDA
TRABUCO
ALICIA
RANCHO SANTA MARGARITA
MISSION VIEJO
OLYMPIAD
241
LAGUNA WOODS
MUIRLANDS
ALICIA
JERONIMO
5
LA PAZ
FELIPE
COUNTY OF ORANGE
LAGUNA HILLS
ALISO VIEJO
73
OSO
MARGUERITE
CABOT
CROWN VALLEY
COUNTY OF ORANGE
LAGUNA BEACH
LAGUNA NIGUEL
AVERY
SAN JUAN CAPISTRANO

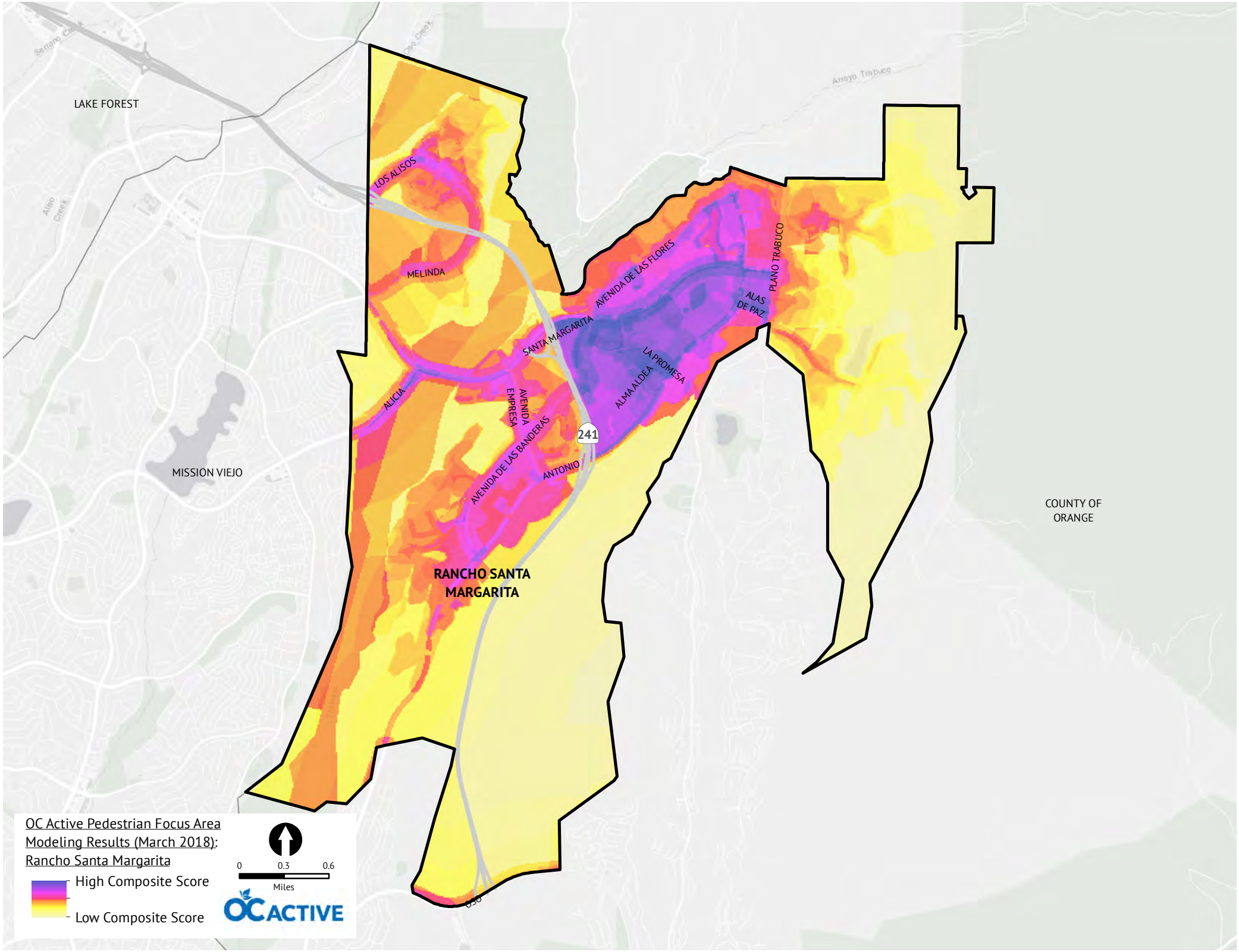

HUNTINGTON BEACH
COSTA MESA
IRVINE
NEWPORT BEACH
COUNTY OF ORANGE
Unincorporated County of Orange
Sand Canyon Wash
73
55
405
19TH
15TH
16TH
PLACENTIA
HOSPITAL
SUPERIOR
NEWPORT
VIA LIDO
32ND
WESTCLIFF
DOVER
SANTIAGO
IRVINE
MESA
BRISTOL
BIRCH
MACARTHUR
VON KARMAN
UNIVERSITY
EASTBLUFF
JAMBOREE
BISON
FORD
BUFFALO
PRAIRIE
BONITA CANYON
SANTA CRUZ
SANTA ROSA
SPYGLASS HILL
BAYSIDE
COAST
NEWPORT CENTER
AVOCADO
SAN MIGUEL
SAN JOAQUIN HILLS
MARGUERITE
NEWPORT COAST
BALBOA
OC Active Pedestrian Focus Area Modeling Results (March 2018): Newport Beach
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.5
1
Miles
OCACTIVE
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

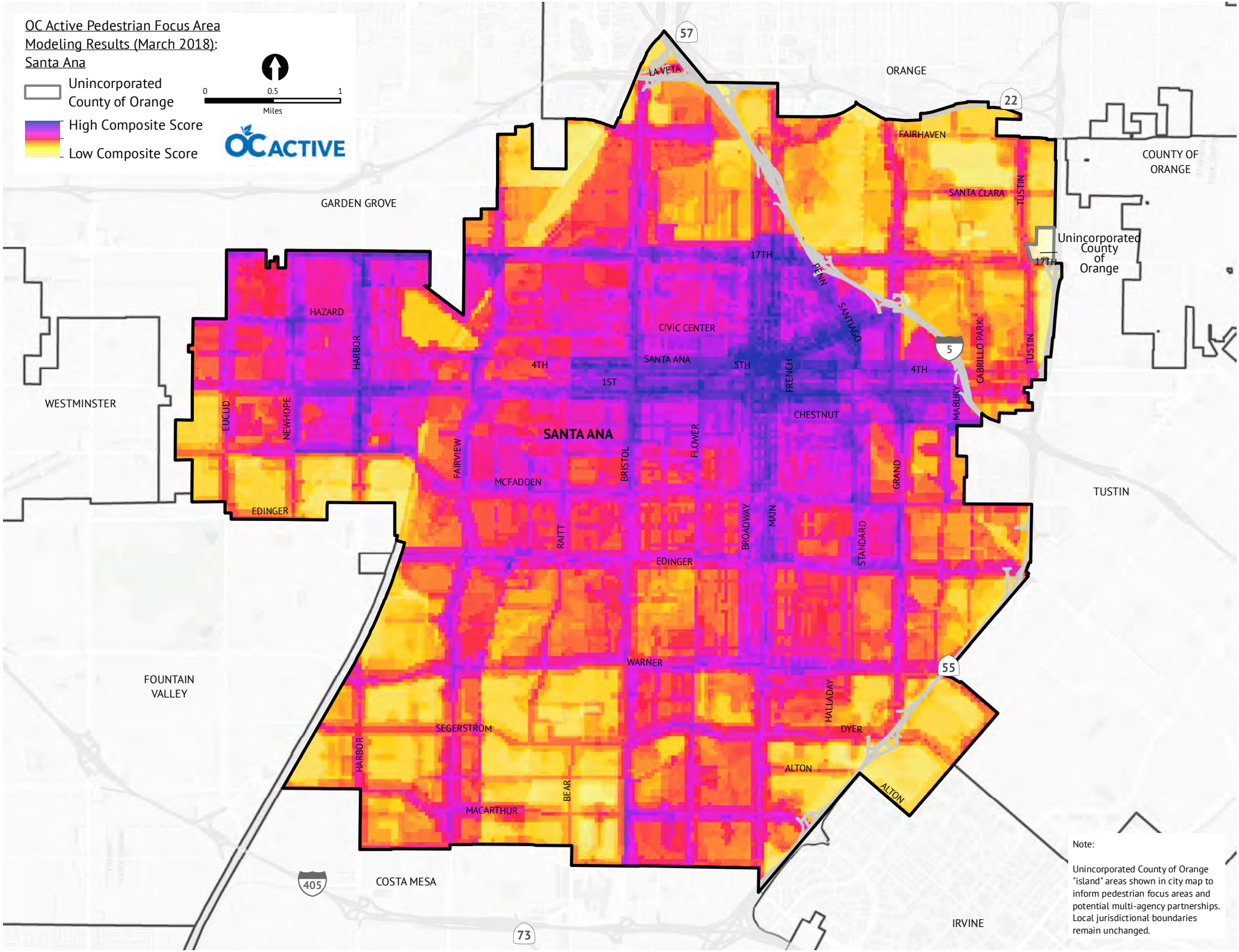


Note:

Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

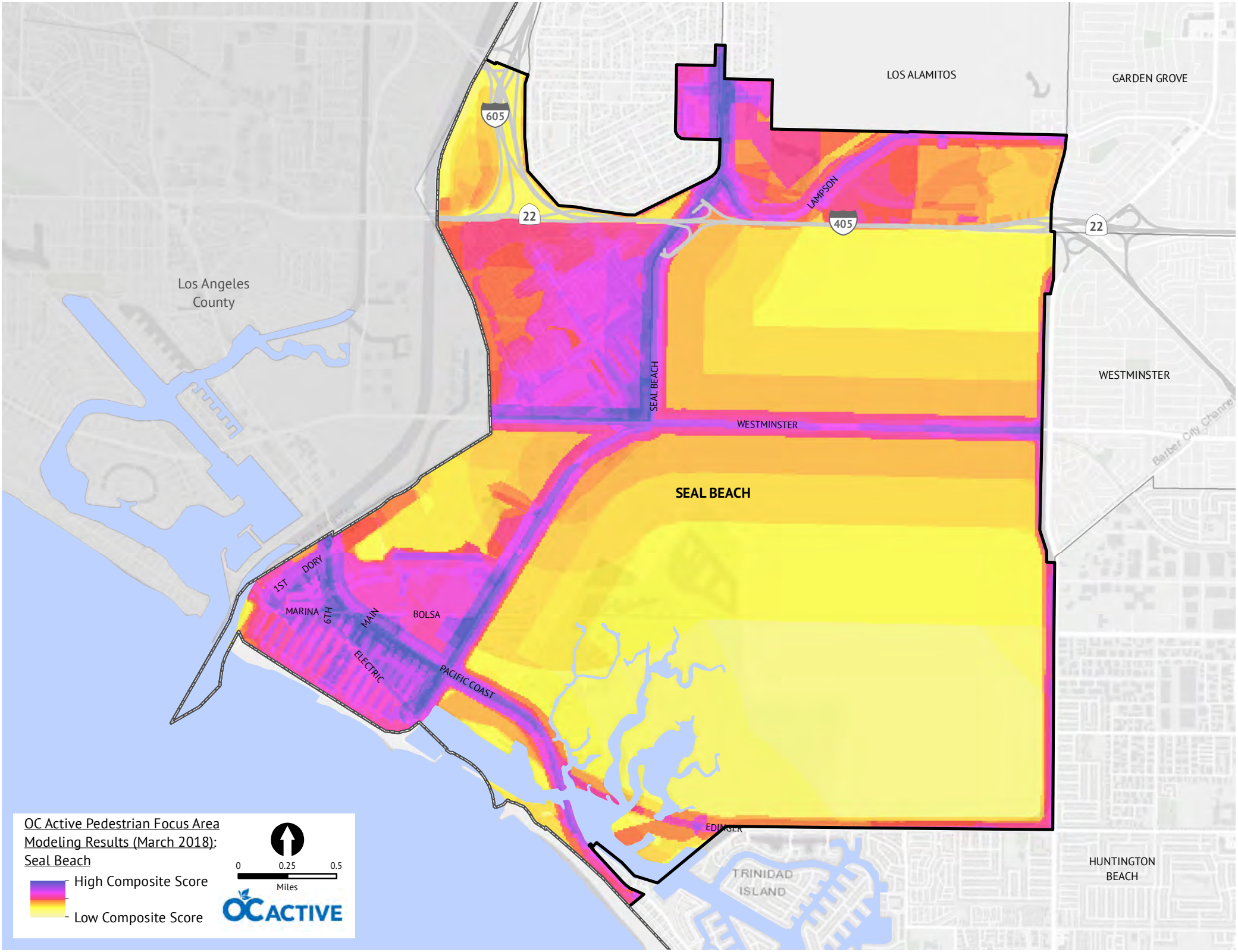

OC Active Pedestrian Focus Area Modeling Results (March 2018): Placentia
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OC ACTIVE
BREA
GOLDEN
IMPERIAL
VALENCIA
BASTANCHURY
KRAEMER
PLACENTIA
YORBA LINDA
PALM
Unincorporated County of Orange
90
FULLERTON
57
MADISON
BRADFORD
PLACENTIA
BUENA VISTA
ALTA VISTA
CHAPMAN
CROWTHER
ORANGETHORPE
MELROSE
ROSE
JEFFERSON
RICHFIELD
LAKEVIEW
MIRA LOMA
ANAHEIM
Anaheim Lake
Carbon Creek
91
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

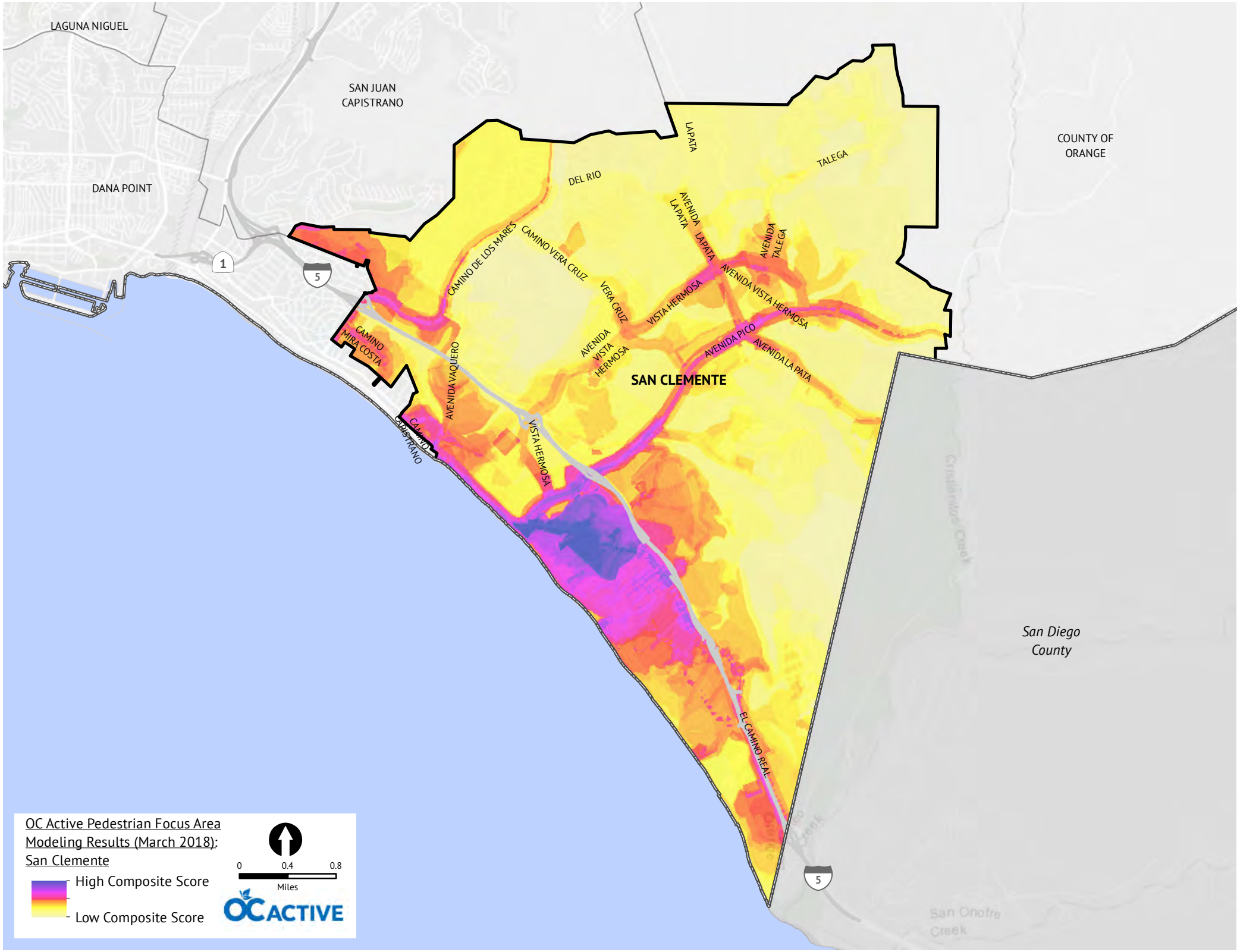

LAKE FOREST
MISSION VIEJO
COUNTY OF ORANGE
RANCHO SANTA MARGARITA
LOS ALISOS
MELINDA
ALICIA
AVENIDA DE LAS BANDERAS
AVENIDA EMPRESA
ANTONIO
SANTA MARGARITA
AVENIDA DE LAS FLORES
ALMA ALDEA
LA PROMESA
ALAS DE PAZ
PLANO TRABUCO
241
OC Active Pedestrian Focus Area Modeling Results (March 2018): Rancho Santa Margarita
High Composite Score
Low Composite Score
0
0.3
0.6
Miles
OCACTIVE

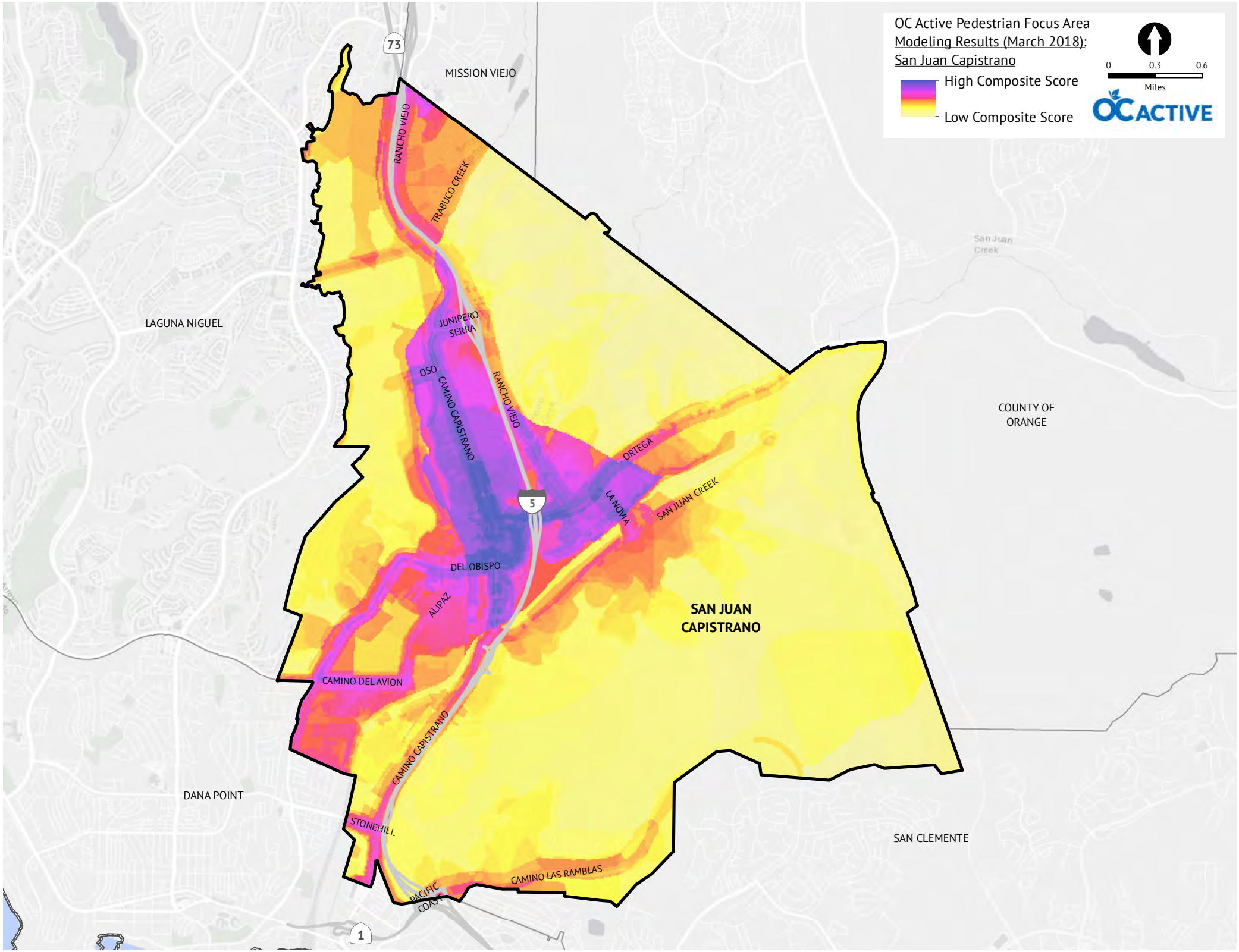


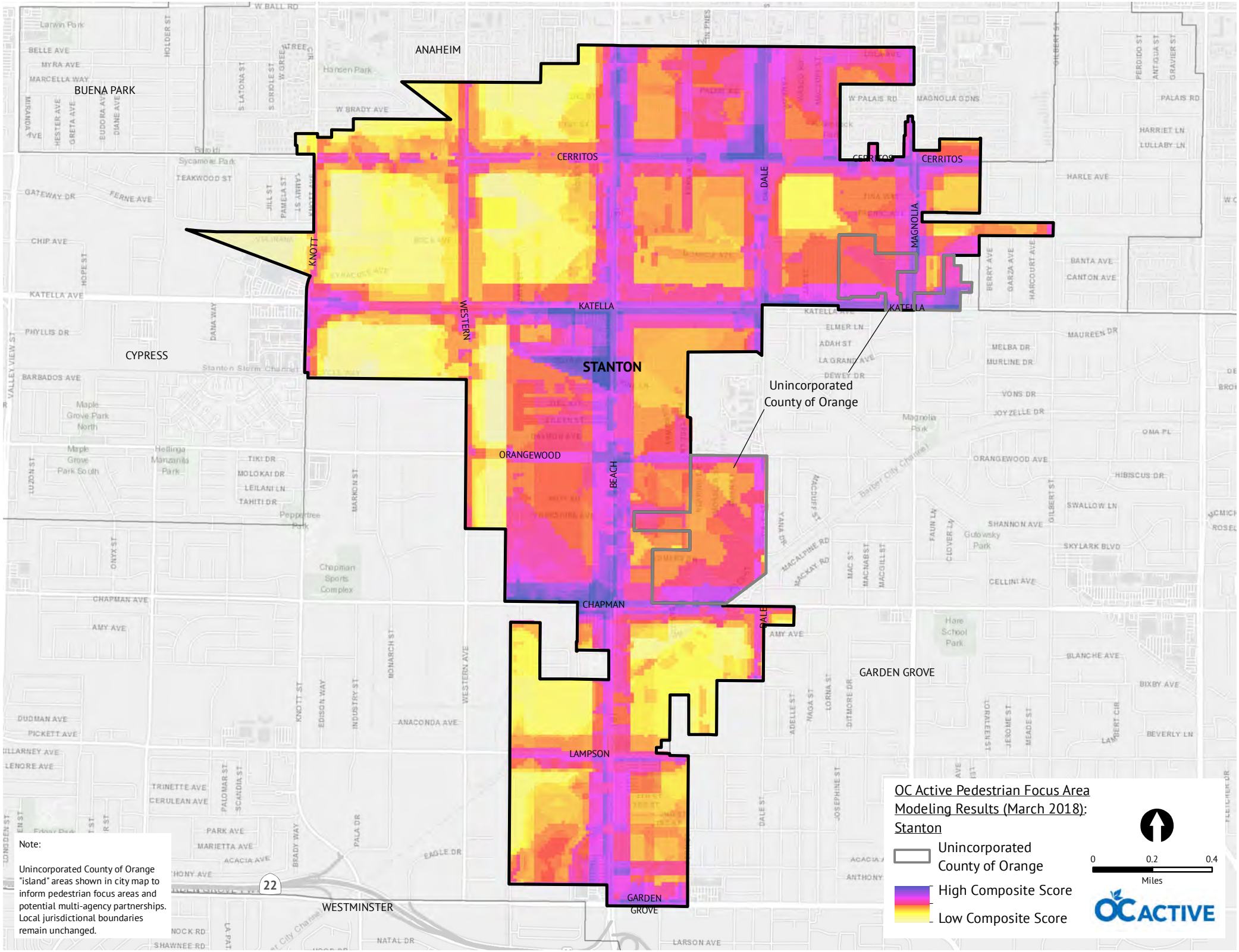
Note:

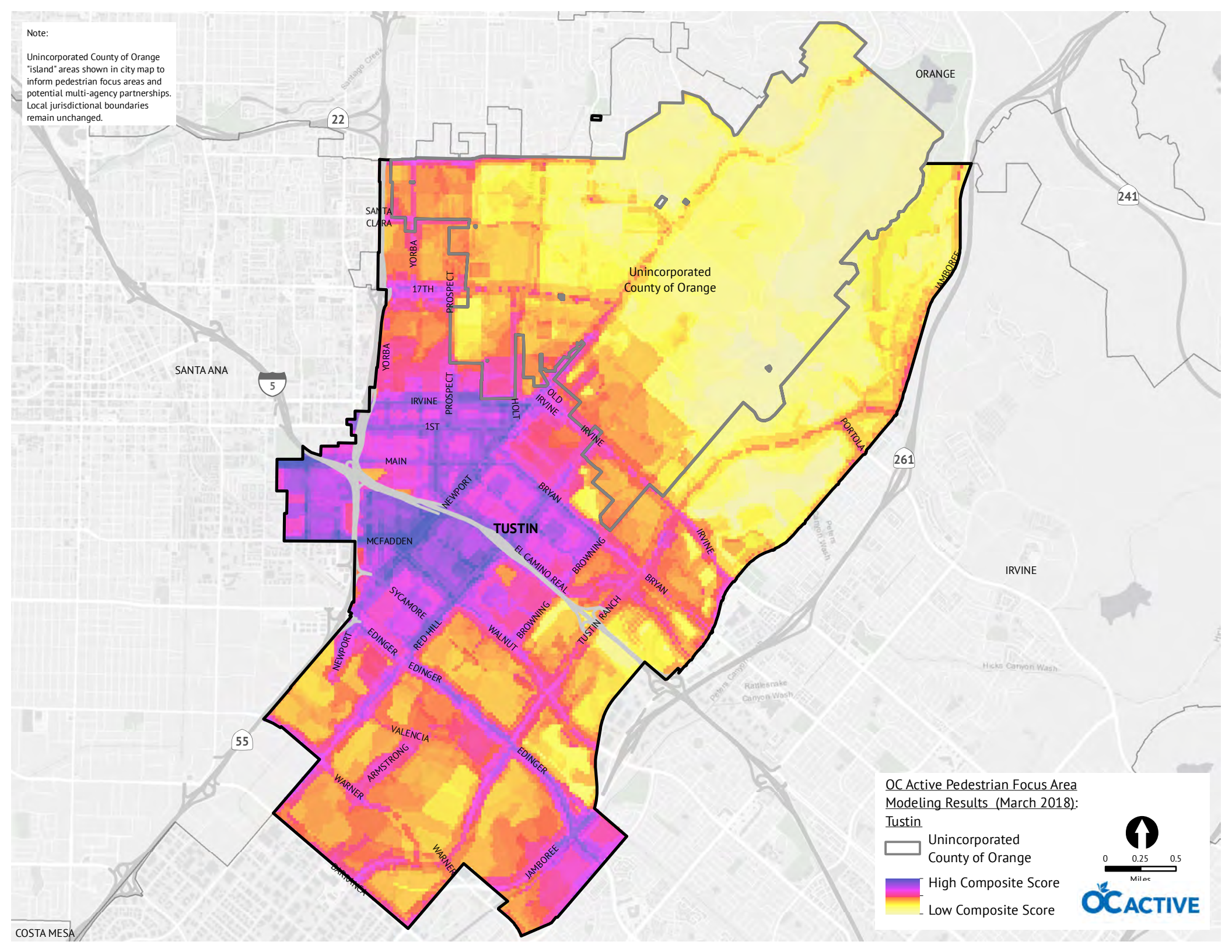
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

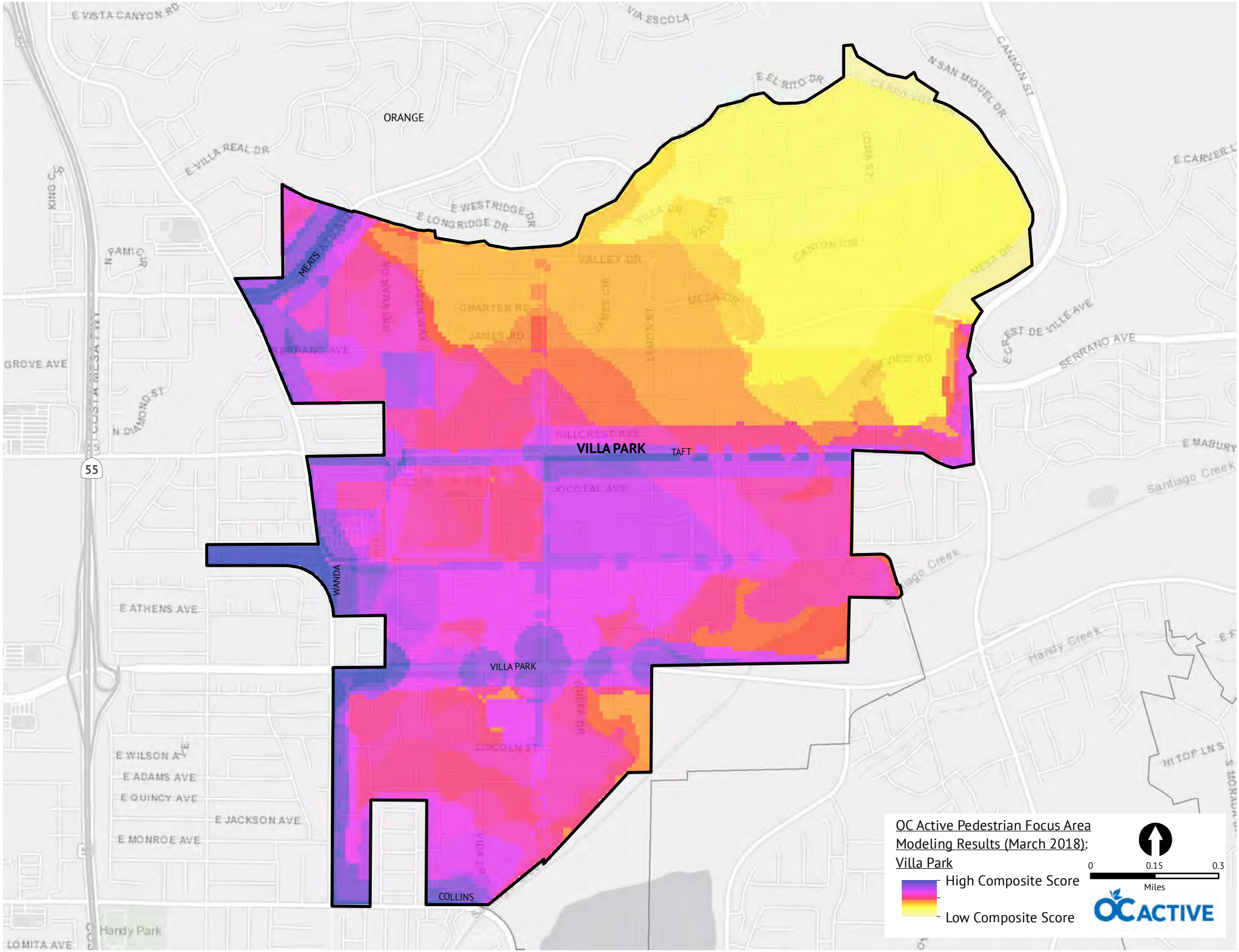

LOS ALAMITOS
GARDEN GROVE
605
22
LAMPSON
405
22
Los Angeles
County
SEAL BEACH
WESTMINSTER
WESTMINSTER
Barber City Channel
SEAL BEACH
1ST
DORY
MARINA
6TH
MAIN
BOLSA
ELECTRIC
PACIFIC COAST
EDINGER
TRINIDAD
ISLAND
HUNTINGTON
BEACH
OC Active Pedestrian Focus Area
Modeling Results (March 2018):
Seal Beach
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE

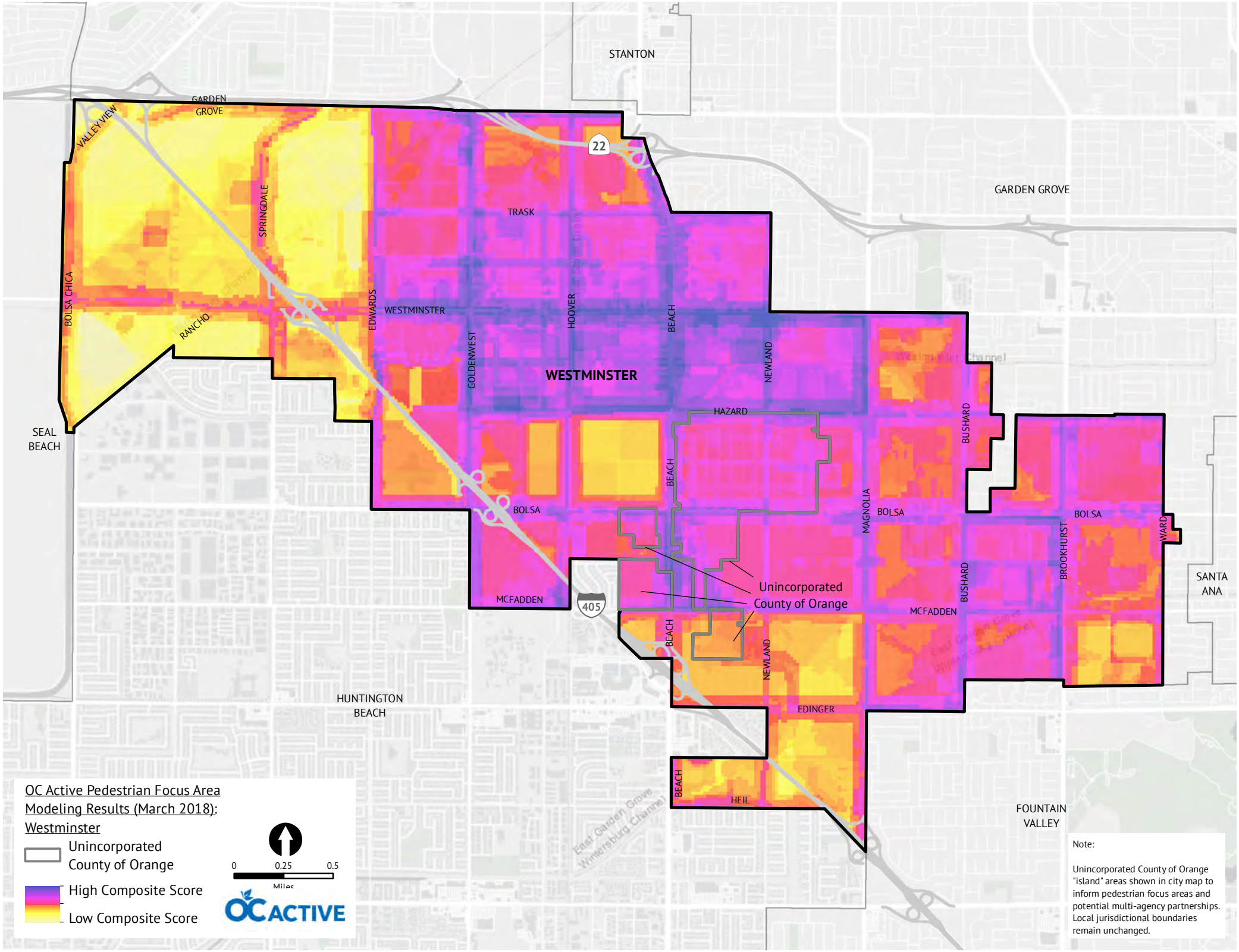

LAGUNA NIGUEL
SAN JUAN CAPISTRANO
DANA POINT
COUNTY OF ORANGE
SAN CLEMENTE
San Diego County
DEL RIO
LAPATA
TALEGA
AVENIDA LAPATA
AVENIDA TALEGA
CAMINO DE LOS MARES
CAMINO VERA CRUZ
VERA CRUZ
VISTA HERMOSA
AVENIDA VISTA HERMOSA
AVENIDA PICO
AVENIDA LA PATA
AVENIDA VISTA HERMOSA
CAMINO MIRA COSTA
AVENIDA VAQUERO
CAMINO CAPISTRANO
VISTA HERMOSA
EL CAMINO REAL
San Onofre Creek
1
5
5
OC Active Pedestrian Focus Area Modeling Results (March 2018): San Clemente
High Composite Score
Low Composite Score
0
0.4
0.8
Miles
OCACTIVE

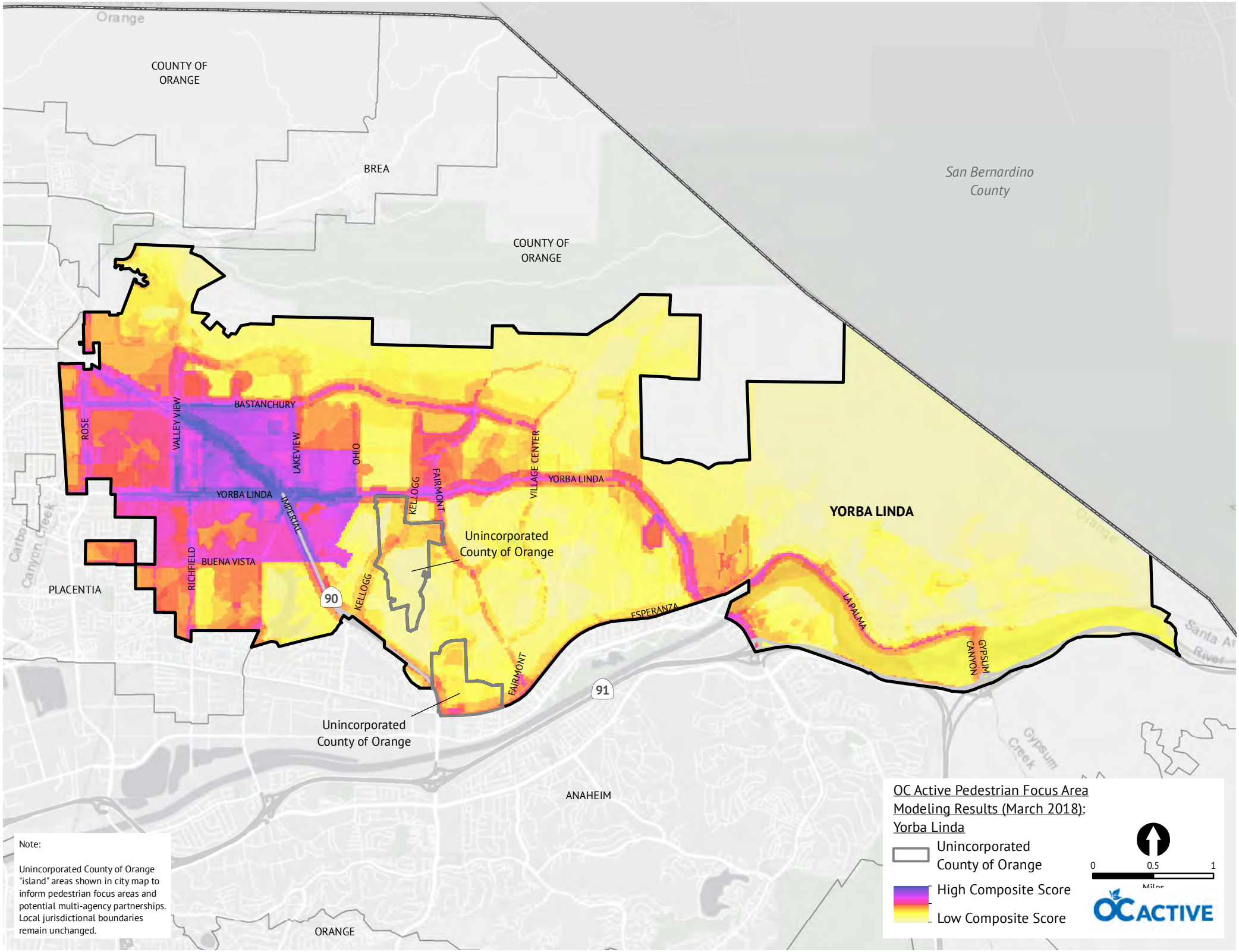

OC Active Pedestrian Focus Area Modeling Results (March 2018): San Juan Capistrano
High Composite Score
Low Composite Score
0
0.3
0.6
Miles
OCACTIVE
MISSION VIEJO
LAGUNA NIGUEL
DANA POINT
SAN CLEMENTE
COUNTY OF ORANGE
SAN JUAN CAPISTRANO
RANCHO VIEJO
TRABUCO CREEK
JUNIPERO SERRA
OSO
CAMINO CAPISTRANO
RANCHO VIEJO
ORTEGA
LA NOVIA
SAN JUAN CREEK
DEL OBISPO
ALIPAZ
CAMINO DEL AVION
CAMINO CAPISTRANO
STONEHILL
CAMINO LAS RAMBLAS
PACIFIC COAST
San Juan Creek
73
5
1


ANAHEIM
BUENA PARK
CYPRESS
STANTON
CERRITOS
KATELLA
ORANGEWOOD
CHAPMAN
LAMPSON
GARDEN GROVE
WESTMINSTER
Unincorporated County of Orange
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
OC Active Pedestrian Focus Area Modeling Results (March 2018): Stanton
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.2
0.4
Miles
OC ACTIVE

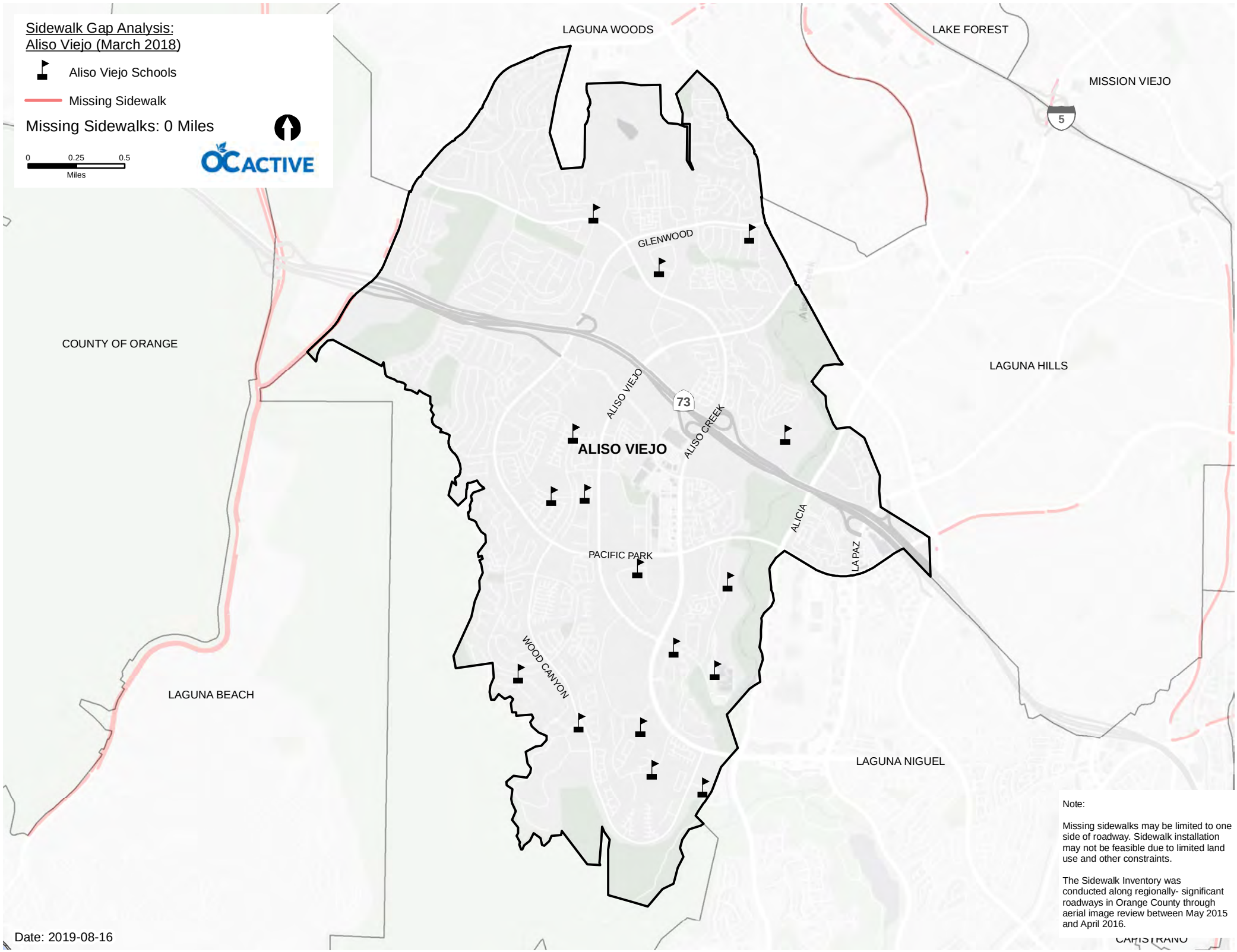

Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
ORANGE
SANTA CLARA
SANTA ANA
IRVINE
TUSTIN
COSTA MESA
Unincorporated County of Orange
YORBA
17TH
PROSPECT
1ST
MAIN
NEWPORT
BRYAN
MCFADDEN
EL CAMINO REAL
BROWNING
SYCAMORE
RED HILL
WALNUT
TUSTIN RANCH
EDINGER
VALENCIA
ARMSTRONG
WARNER
JAMBOREE
IRVINE
PORTOLA
OLD IRVINE
HOLT
22
5
55
241
261
OC Active Pedestrian Focus Area Modeling Results (March 2018): Tustin
Unincorporated County of Orange
High Composite Score
Low Composite Score
0 0.25 0.5
Miles
OC ACTIVE

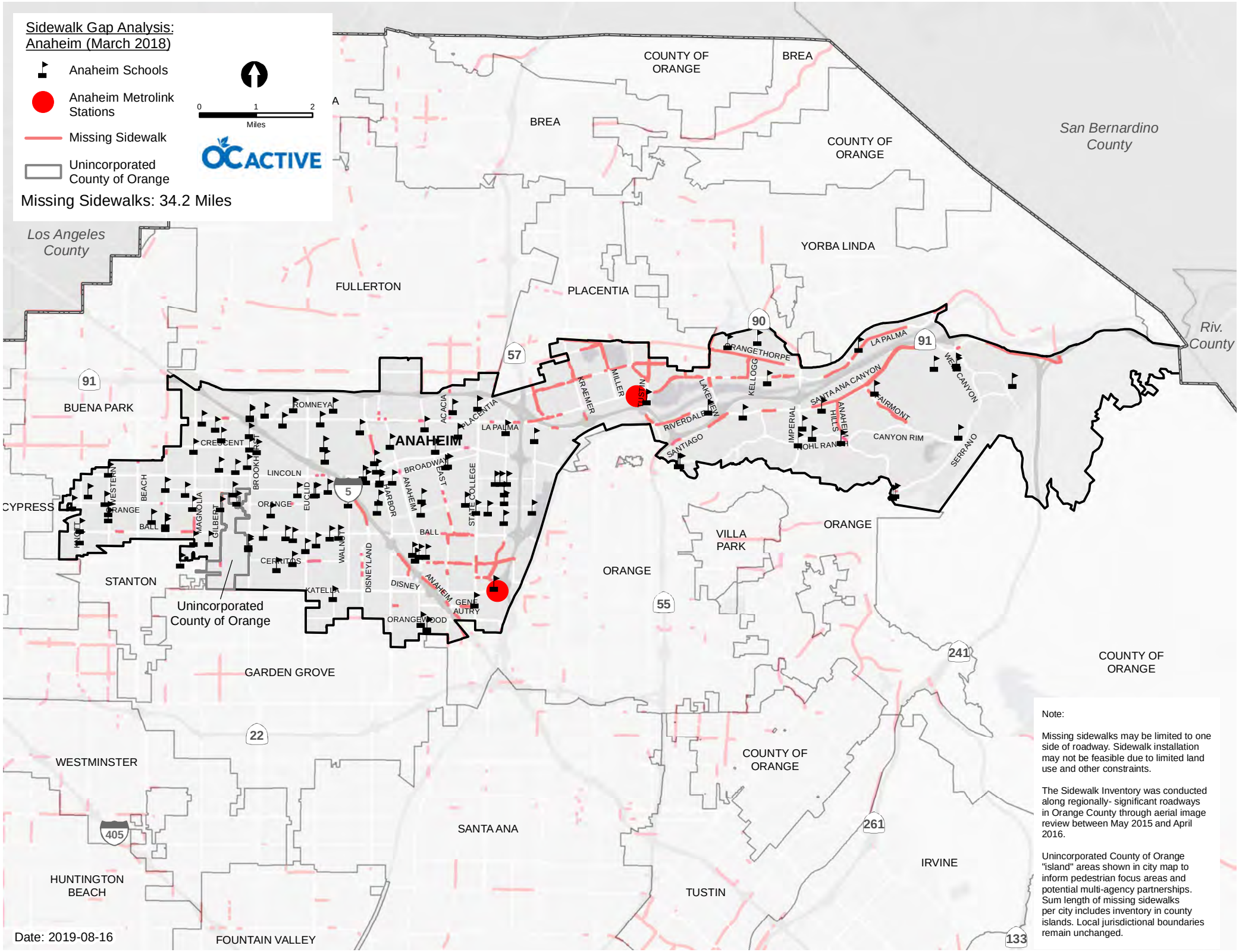

OC Active Pedestrian Focus Area
Modeling Results (March 2018):
Villa Park
High Composite Score
Low Composite Score
0
0.15
0.3
Miles
OC ACTIVE
VILLA PARK
ORANGE
TAFT
COLLINS
WANDA
MEATS AVE
E VISTA CANYON RD
VIA ESCOLA
E EL RIO DR
N SAN MIGUEL DR
CANNON ST
E VILLA REAL DR
E WESTRIDGE DR
E LONGRIDGE DR
VALLEY DR
CANYON CIR
MESA DR
CHARTER RD
JAMES RD
LEMON ST
E CREST DE VILLE AVE
SERRANO AVE
GROVE AVE
N DIAMOND ST
COSTA MESA FWY
55
HILLCREST AVE
E MABURY
Santiago Creek
E ATHENS AVE
Handy Creek
E WILSON AVE
E ADAMS AVE
E QUINCY AVE
E JACKSON AVE
E MONROE AVE
LINCOLN ST
Handy Park
LOMITA AVE

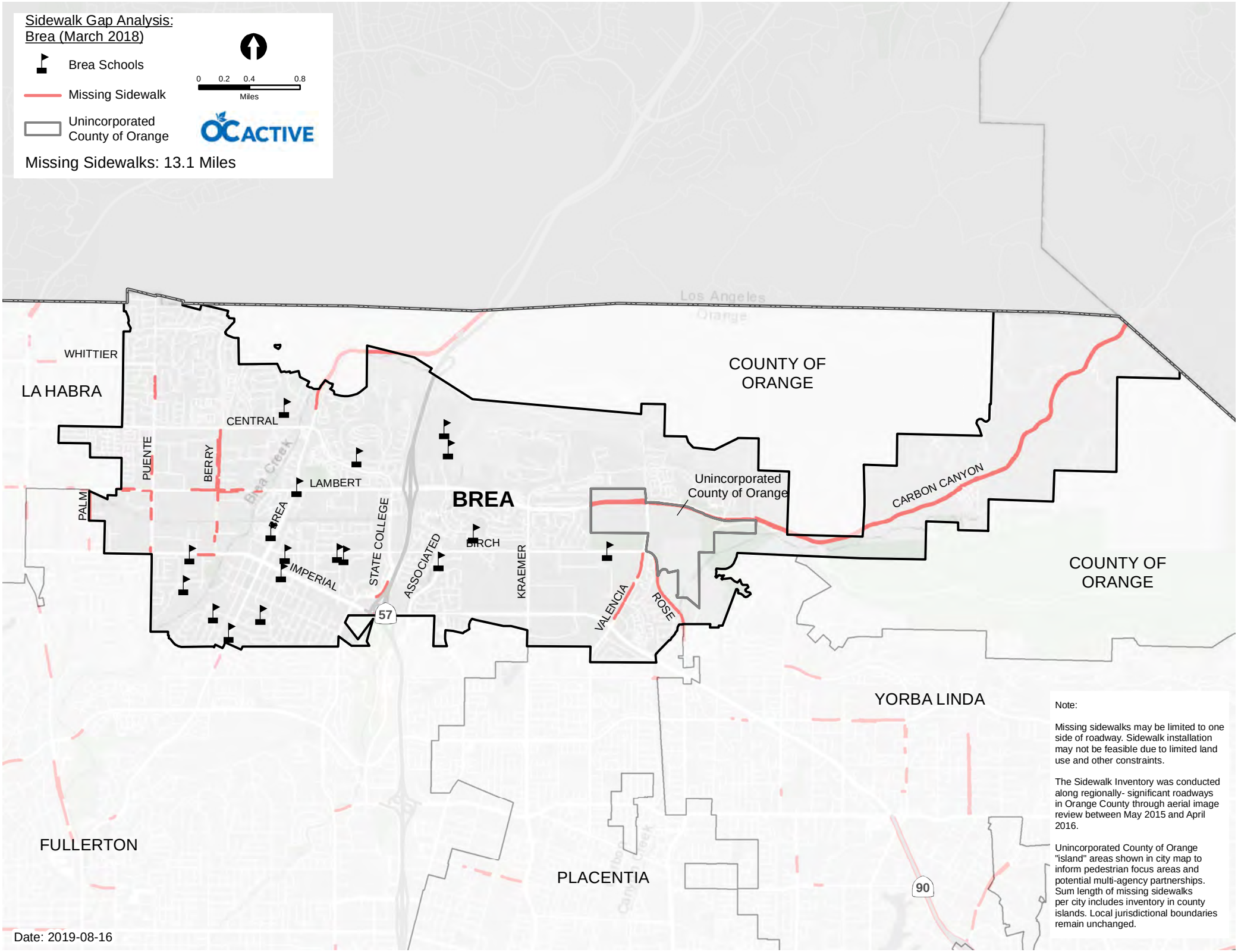

STANTON
GARDEN GROVE
VALLEY VIEW
SPRINGDALE
22
TRASK
BOLSA CHICA
RANCHO
EDWARDS
WESTMINSTER
GOLDENWEST
HOOVER
BEACH
NEWLAND
WESTMINSTER
HAZARD
BUSHARD
SEAL BEACH
BOLSA
MAGNOLIA
BROOKHURST
WARD
SANTA ANA
Unincorporated County of Orange
MCFADDEN
405
HUNTINGTON BEACH
EDINGER
HEIL
FOUNTAIN VALLEY
OC Active Pedestrian Focus Area Modeling Results (March 2018): Westminster
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.25
0.5
Miles
OCACTIVE
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.

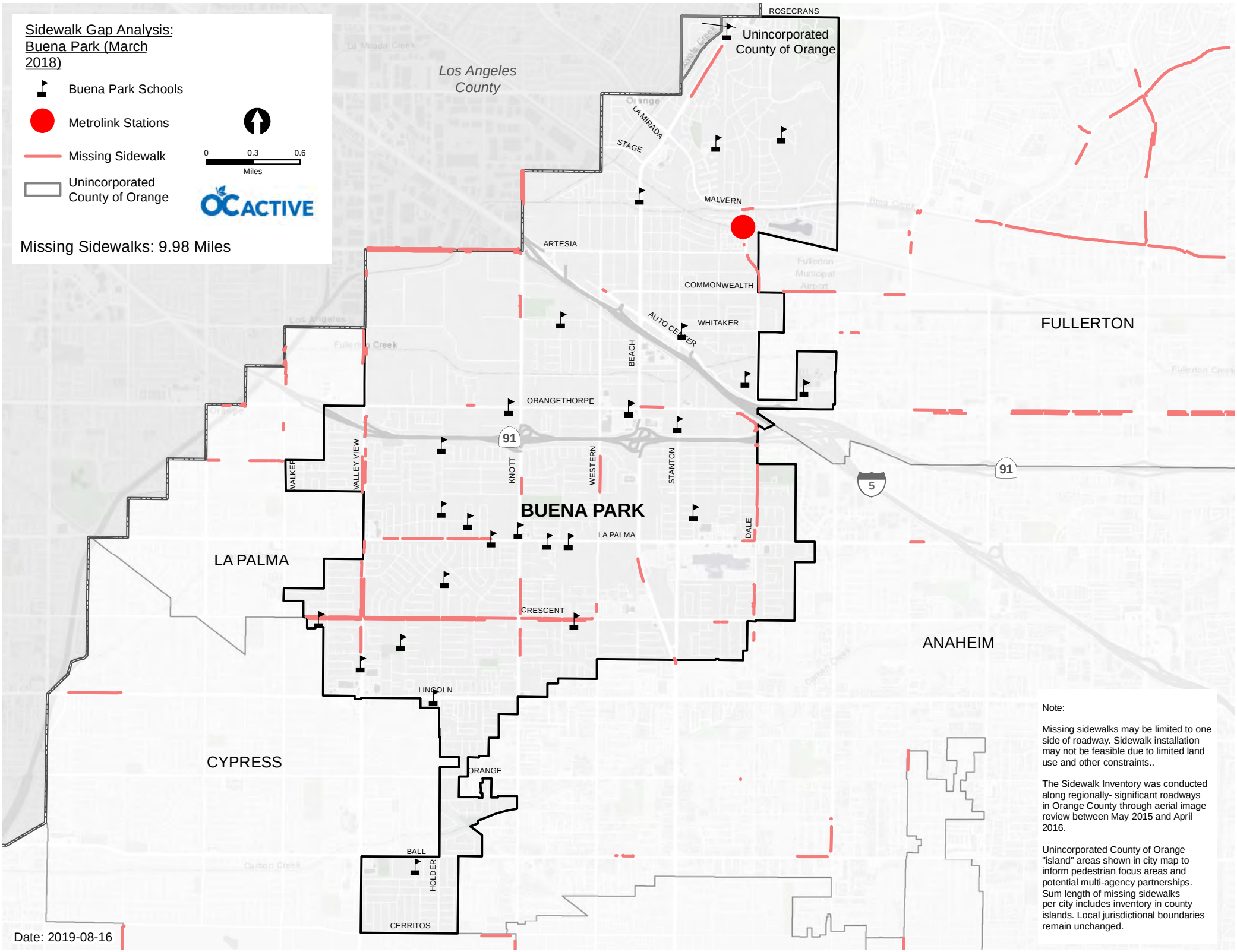

COUNTY OF ORANGE
BREA
COUNTY OF ORANGE
San Bernardino County
BASTANCHURY
ROSE
VALLEY VIEW
LAKEVIEW
OHIO
KELLOGG
FAIRMONT
VILLAGE CENTER
YORBA LINDA
YORBA LINDA
IMPERIAL
YORBA LINDA
Unincorporated County of Orange
RICHFIELD
BUENA VISTA
PLACENTIA
90
KELLOGG
ESPERANZA
LA PALMA
GYPSUM CANYON
FAIRMONT
91
Unincorporated County of Orange
ANAHEIM
ORANGE
Carbon Canyon Creek
Santa Ana River
Gypsum Creek
Note:
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Local jurisdictional boundaries remain unchanged.
OC Active Pedestrian Focus Area Modeling Results (March 2018): Yorba Linda
Unincorporated County of Orange
High Composite Score
Low Composite Score
0
0.5
1
Miles
OC ACTIVE

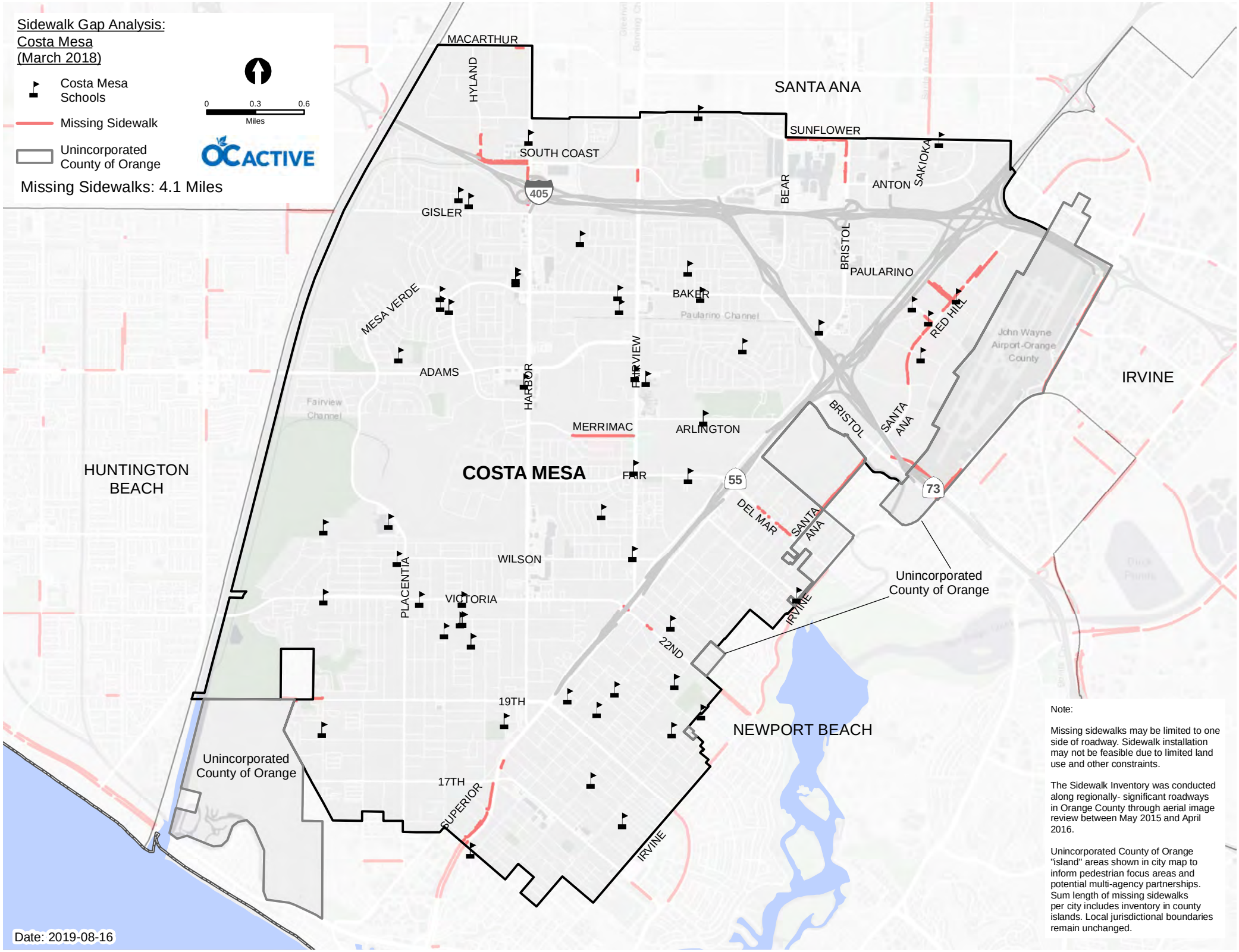
A.5 City-by-City Missing Sidewalk Maps

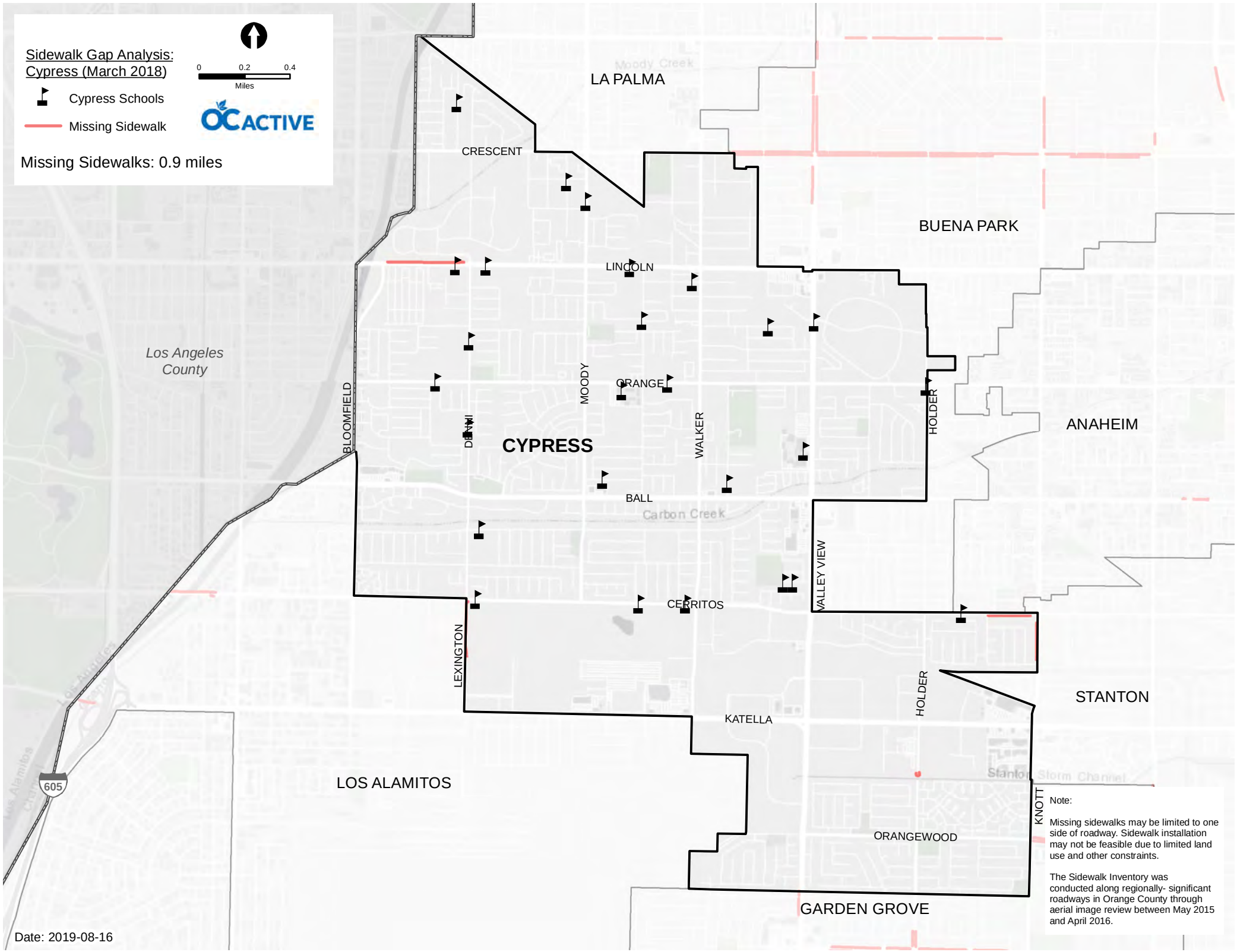

Sidewalk Gap Analysis:
Aliso Viejo (March 2018)
Aliso Viejo Schools
Missing Sidewalk
Missing Sidewalks: 0 Miles
0
0.25
0.5
Miles
OCACTIVE
LAGUNA WOODS
LAKE FOREST
MISSION VIEJO
5
GLENWOOD
COUNTY OF ORANGE
LAGUNA HILLS
ALISO VIEJO
73
ALISO CREEK
ALISO VIEJO
PACIFIC PARK
ALICIA
LA PAZ
WOOD CANYON
LAGUNA BEACH
LAGUNA NIGUEL
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16


Sidewalk Gap Analysis:
Anaheim (March 2018)
Anaheim Schools
Anaheim Metrolink Stations
Missing Sidewalk
Unincorporated County of Orange
0 1 2
Miles
OCACTIVE
Missing Sidewalks: 34.2 Miles
Los Angeles County
San Bernardino County
Riv. County
COUNTY OF ORANGE
BREA
YORBA LINDA
FULLERTON
PLACENTIA
BUENA PARK
ANAHEIM
CYPRESS
STANTON
VILLA PARK
ORANGE
GARDEN GROVE
WESTMINSTER
SANTA ANA
HUNTINGTON BEACH
TUSTIN
IRVINE
FOUNTAIN VALLEY
Unincorporated County of Orange
ROMNEYA
CRESCENT
LINCOLN
BROADWAY EAST
LA PALMA
ORANGETHORPE
KRAEMER
MILLER
NUTWOOD
LAKEVIEW
KELLOGG
RIVERDALE
SANTIAGO
SANTA ANA CANYON
IMPERIAL
ANAHEIM HILLS
FAIRMONT
CANYON RIM
WEIR CANYON
SERRANO
BROOKHURST
EUCLID
HARBOR
STATE COLLEGE
BEACH
MAGNOLIA
GILBERT
WESTERN
WALNUT
DISNEYLAND
CERRITOS
KATELLA
DISNEY
GENE AUTRY
ORANGEWOOD
BALL
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.

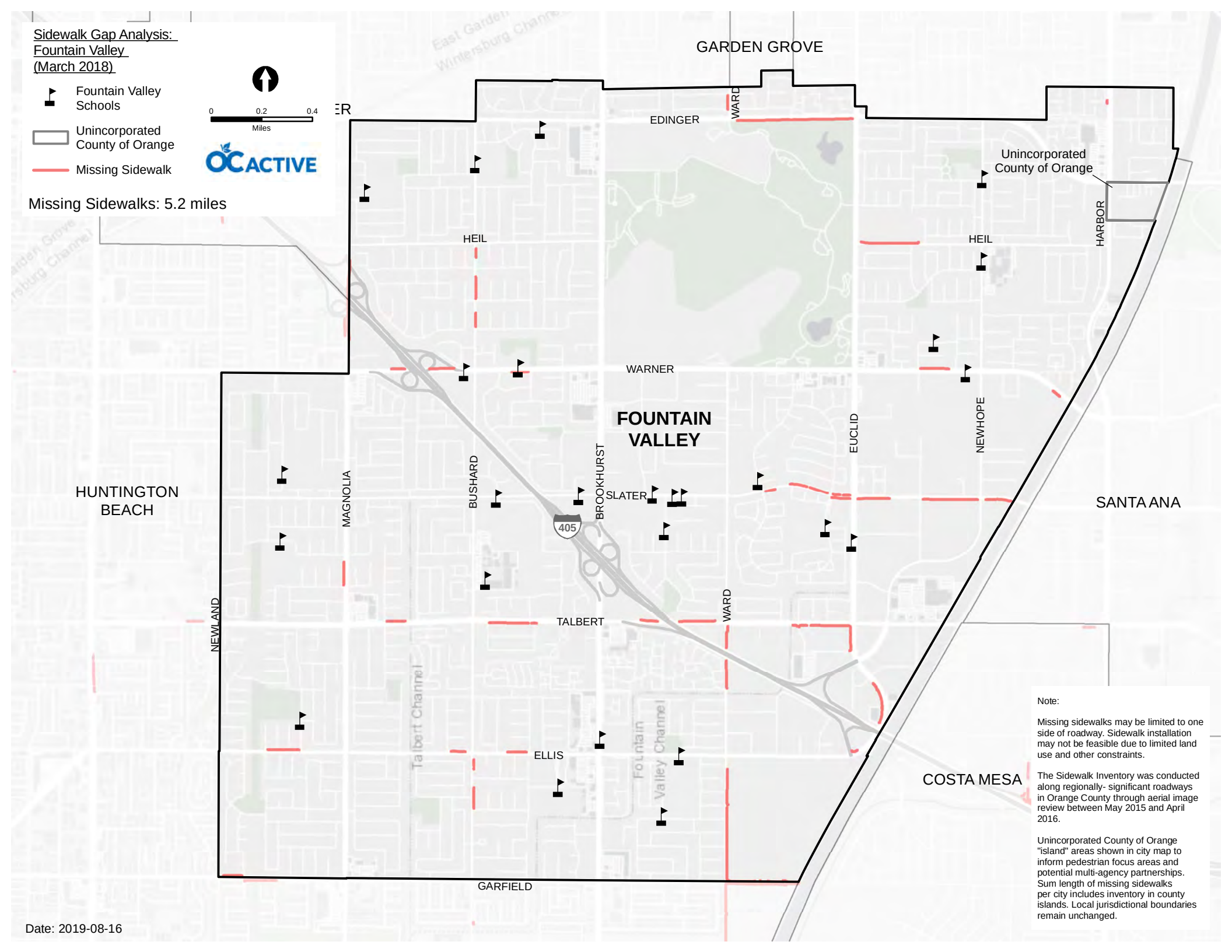

Sidewalk Gap Analysis:
Brea (March 2018)
Brea Schools
Missing Sidewalk
Unincorporated
County of Orange
0 0.2 0.4 0.8
Miles
OCACTIVE
Missing Sidewalks: 13.1 Miles
WHITTIER
LA HABRA
COUNTY OF
ORANGE
CENTRAL
PUENTE
BERRY
LAMBERT
PALM
BREA
BREA
STATE COLLEGE
ASSOCIATED
BIRCH
KRAEMER
IMPERIAL
57
Unincorporated
County of Orange
CARBON CANYON
VALENCIA
ROSE
COUNTY OF
ORANGE
YORBA LINDA
FULLERTON
PLACENTIA
90
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16

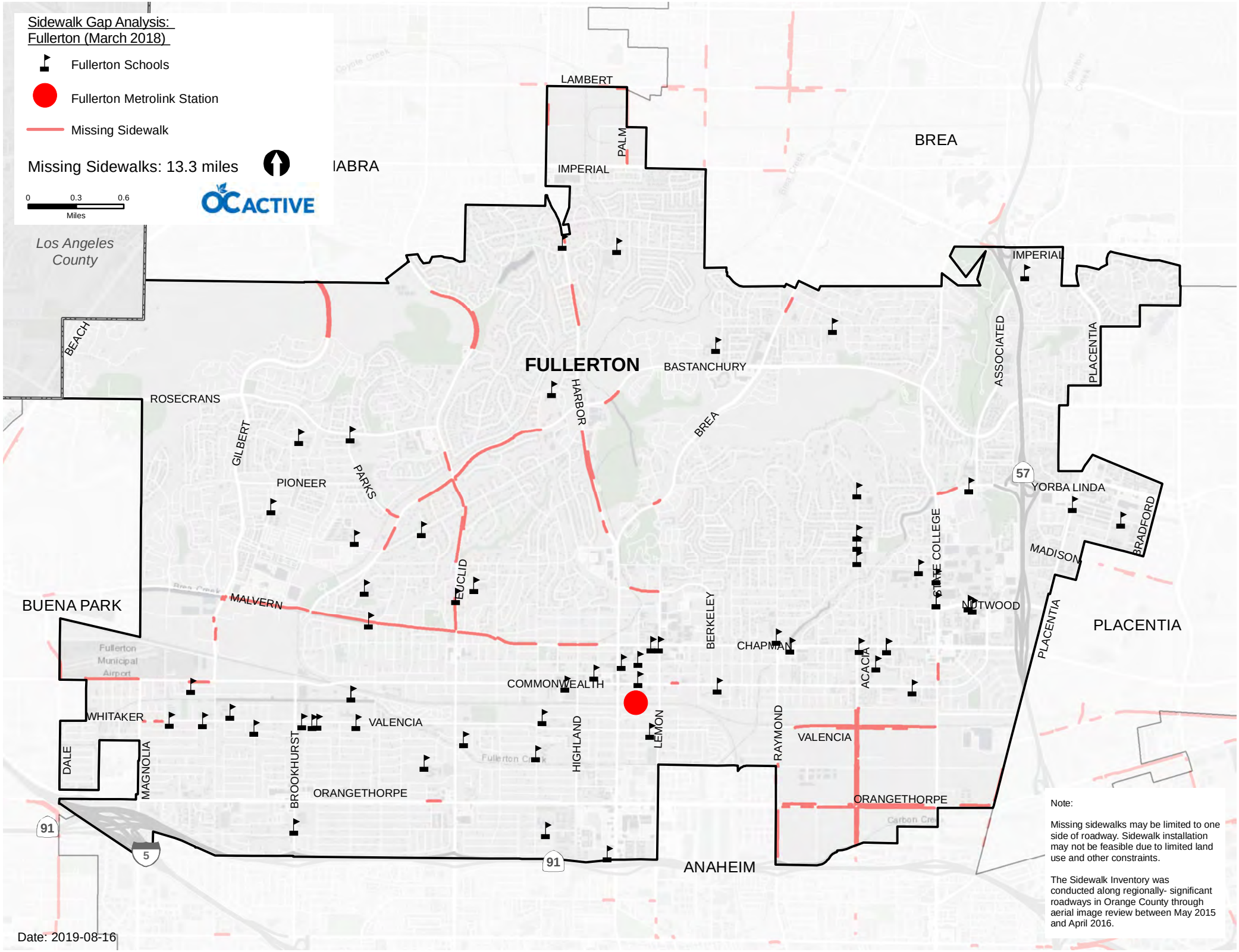

Sidewalk Gap Analysis:
Buena Park (March 2018)
Buena Park Schools
Metrolink Stations
Missing Sidewalk
Unincorporated County of Orange
0 0.3 0.6
Miles
OCACTIVE
Missing Sidewalks: 9.98 Miles
Los Angeles County
Unincorporated County of Orange
ROSECRANS
LA MIRADA
STAGE
MALVERN
ARTESIA
COMMONWEALTH
WHITAKER
AUTO CENTER
BEACH
FULLERTON
ORANGETHORPE
91
KNOTT
WESTERN
STANTON
WALKER
VALLEY VIEW
5
BUENA PARK
LA PALMA
DALE
CRESCENT
ANAHEIM
LINCOLN
CYPRESS
ORANGE
BALL
HOLDER
CERRITOS
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints..
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16


Sidewalk Gap Analysis:
Costa Mesa
(March 2018)
Costa Mesa Schools
Missing Sidewalk
Unincorporated County of Orange
0 0.3 0.6
Miles
OCACTIVE
Missing Sidewalks: 4.1 Miles
MACARTHUR
HYLAND
SANTA ANA
SUNFLOWER
SOUTH COAST
405
GISLER
BEAR
ANTON
SAKIOKA
BRISTOL
PAULARINO
BAKER
MESA VERDE
Paularino Channel
RED HILL
John Wayne Airport-Orange County
IRVINE
ADAMS
HARBOR
FAIRVIEW
Fairview Channel
MERRIMAC
ARLINGTON
HUNTINGTON BEACH
COSTA MESA
FAIR
55
73
DEL MAR
SANTA ANA
WILSON
PLACENTIA
VICTORIA
Unincorporated County of Orange
IRVINE
22ND
19TH
NEWPORT BEACH
Unincorporated County of Orange
17TH
SUPERIOR
IRVINE
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.


Sidewalk Gap Analysis:
Cypress (March 2018)
0 0.2 0.4
Miles
Cypress Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 0.9 miles
LA PALMA
CRESCENT
BUENA PARK
LINCOLN
Los Angeles
County
BLOOMFIELD
MOODY
ORANGE
DENNI
CYPRESS
WALKER
HOLDER
ANAHEIM
BALL
Carbon Creek
VALLEY VIEW
CERRITOS
LEXINGTON
HOLDER
STANTON
KATELLA
605
LOS ALAMITOS
KNOTT
ORANGEWOOD
GARDEN GROVE
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16


Sidewalk Gap Analysis:
Dana Point (March 2018)
Dana Point Schools
Missing Sidewalk
Missing Sidewalks: 5.6 miles
0
0.25
0.5
Miles
OCACTIVE
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
LAGUNA BEACH
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
SAN CLEMENTE
DANA POINT
PACIFIC ISLAND
CROWN VALLEY
CAMINO DEL AVION
NIGUEL
GOLDEN LANTERN
DEL OBISPO
STONEHILL
SELVA
PACIFIC COAST
DEL PRADO
DANA POINT HARBOR
DOHENY PARK
COAST
CAMINO DE ESTRELLA
CAMINO CAPISTRANO
EL CAMINO REAL
5
1
Date: 2019-08-16

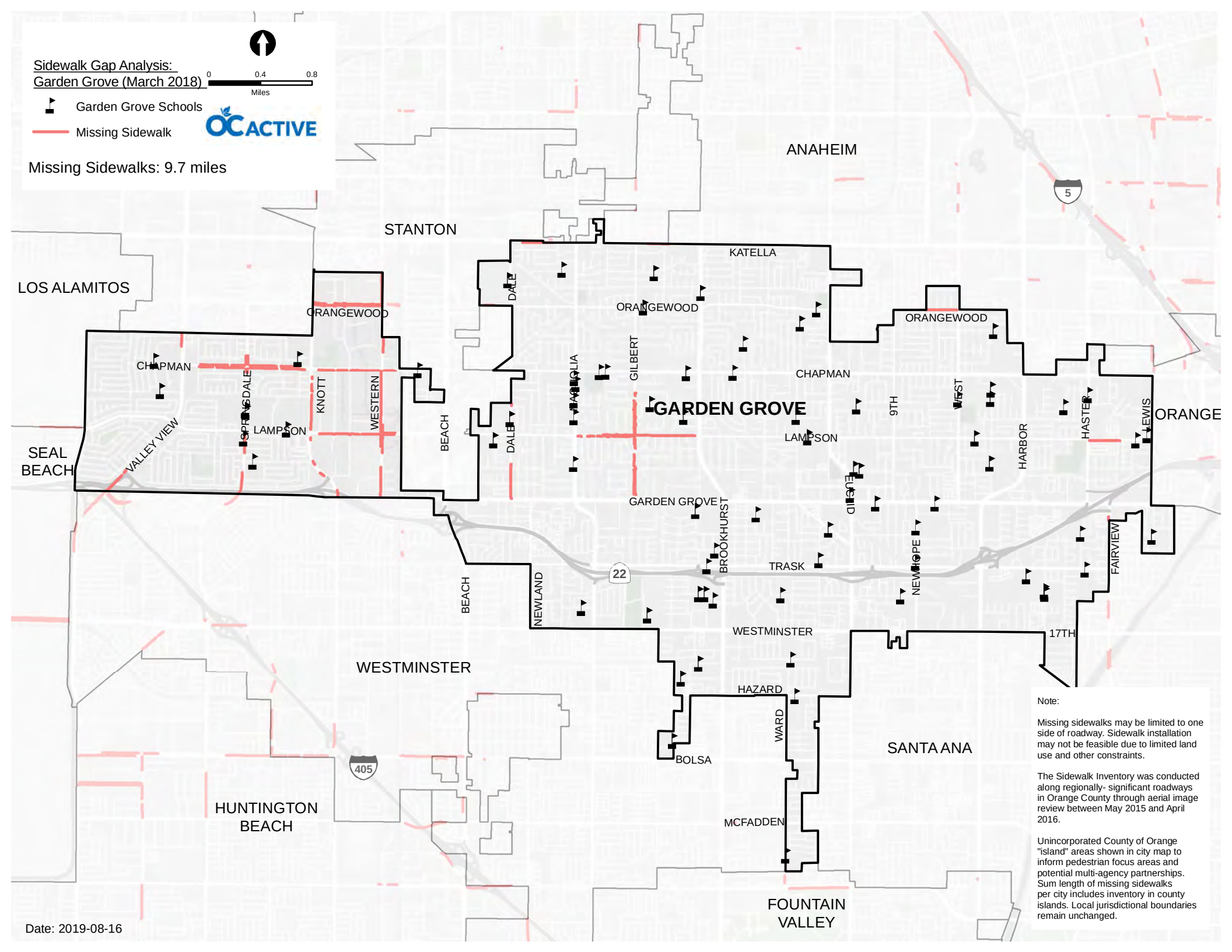

Sidewalk Gap Analysis:
Fountain Valley
(March 2018)
Fountain Valley Schools
Unincorporated County of Orange
Missing Sidewalk
0 0.2 0.4
Miles
OCACTIVE
Missing Sidewalks: 5.2 miles
GARDEN GROVE
EDINGER
WARD
Unincorporated County of Orange
HARBOR
HEIL
HEIL
WARNER
FOUNTAIN VALLEY
EUCLID
NEWHOPE
HUNTINGTON BEACH
MAGNOLIA
BUSHARD
BROOKHURST
SLATER
405
SANTA ANA
NEWLAND
TALBERT
WARD
Talbert Channel
Fountain Valley Channel
ELLIS
COSTA MESA
GARFIELD
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16

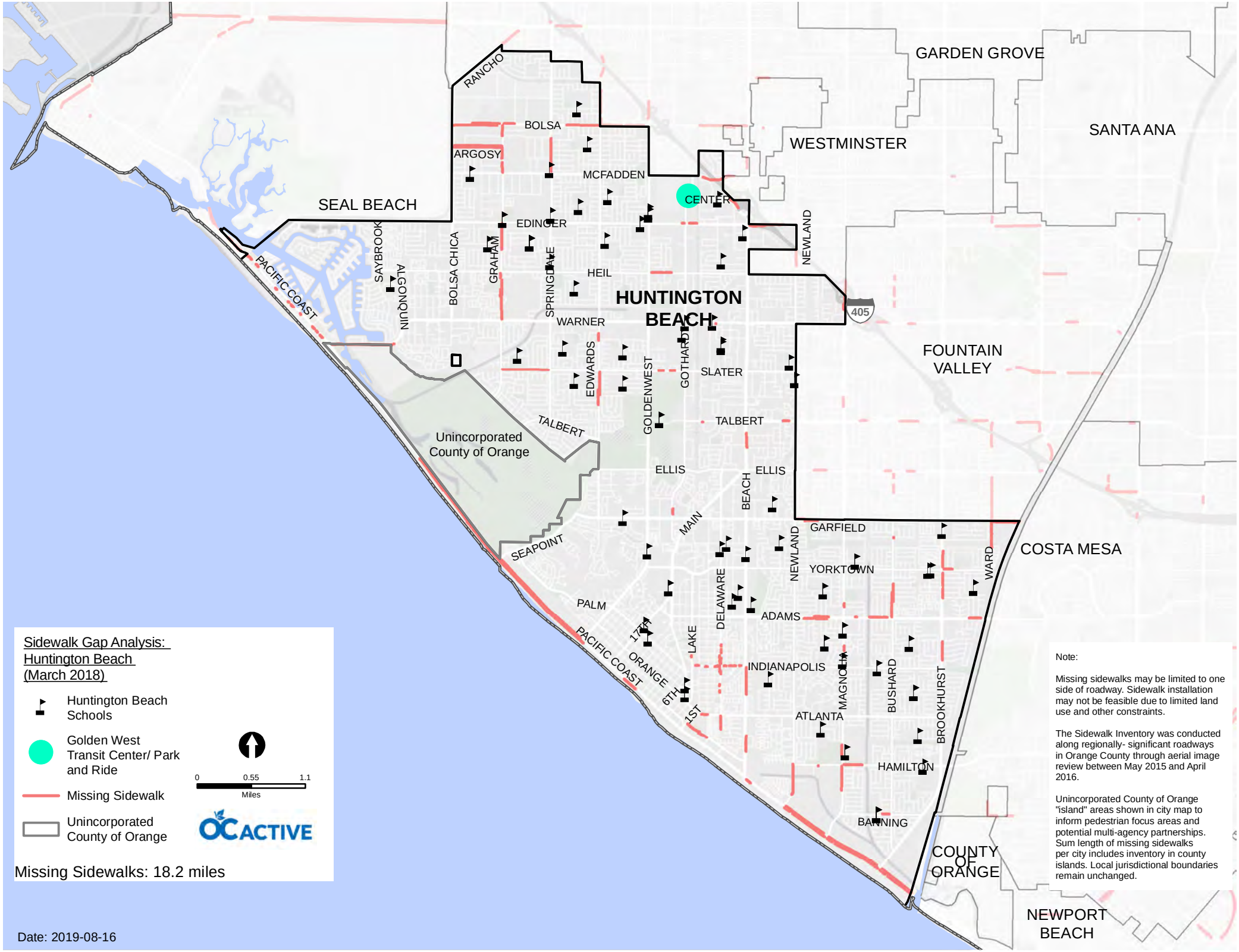


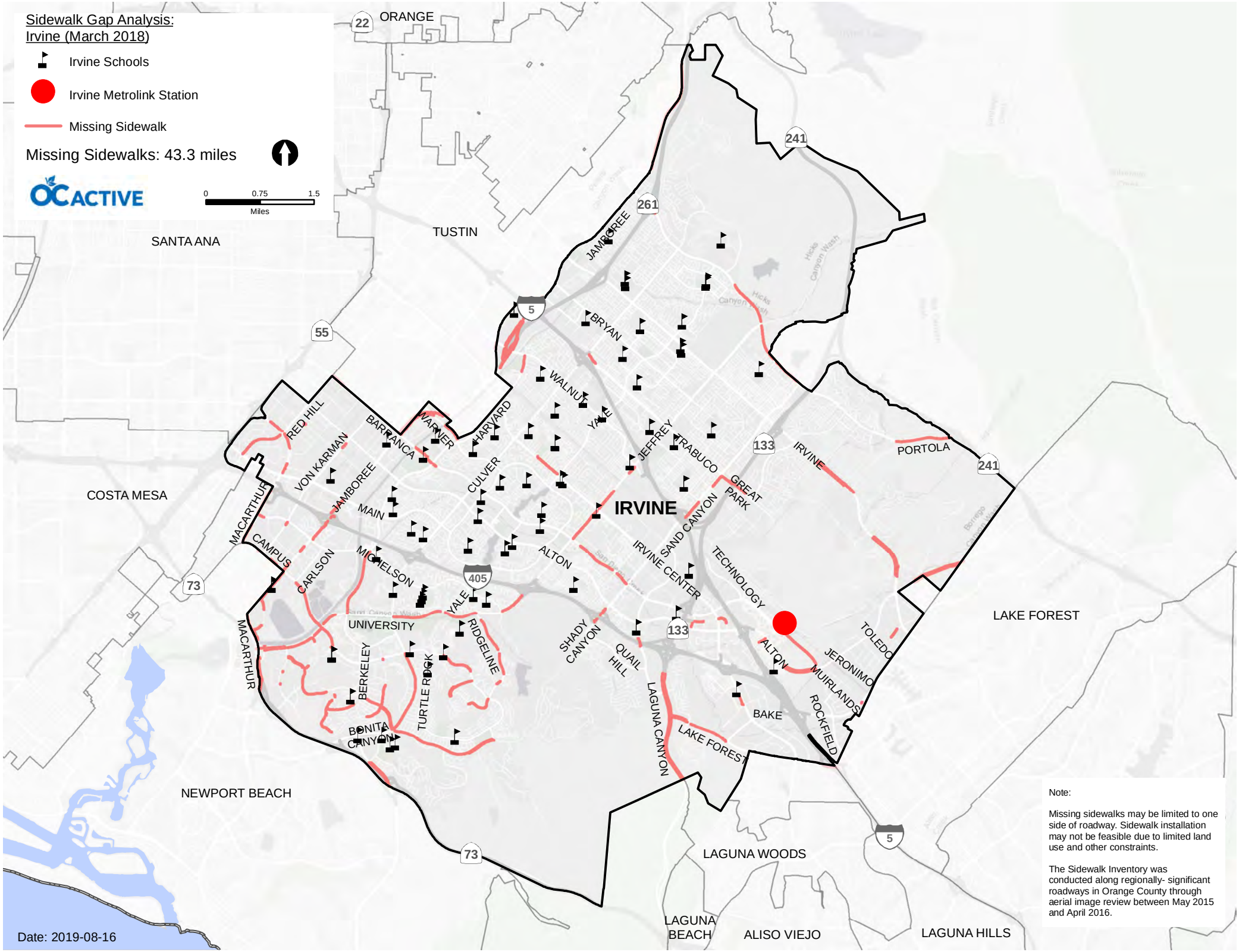
Note:

Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.

The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.


Sidewalk Gap Analysis:
Garden Grove (March 2018)
0
0.4
0.8
Miles
Garden Grove Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 9.7 miles
ANAHEIM
STANTON
LOS ALAMITOS
SEAL BEACH
WESTMINSTER
HUNTINGTON BEACH
SANTA ANA
FOUNTAIN VALLEY
GARDEN GROVE
KATELLA
ORANGEWOOD
CHAPMAN
LAMPSON
GARDEN GROVE
TRASK
WESTMINSTER
HAZARD
BOLSA
MCFADDEN
17TH
ORANGE
DALE
MAGNOLIA
GILBERT
SPRINGDALE
KNOTT
WESTERN
BEACH
VALLEY VIEW
9TH
WEST
HARBOR
HASTER
LEWIS
EUCLID
BROOKHURST
NEWLAND
NEWHOPE
FAIRVIEW
WARD
5
22
405
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.

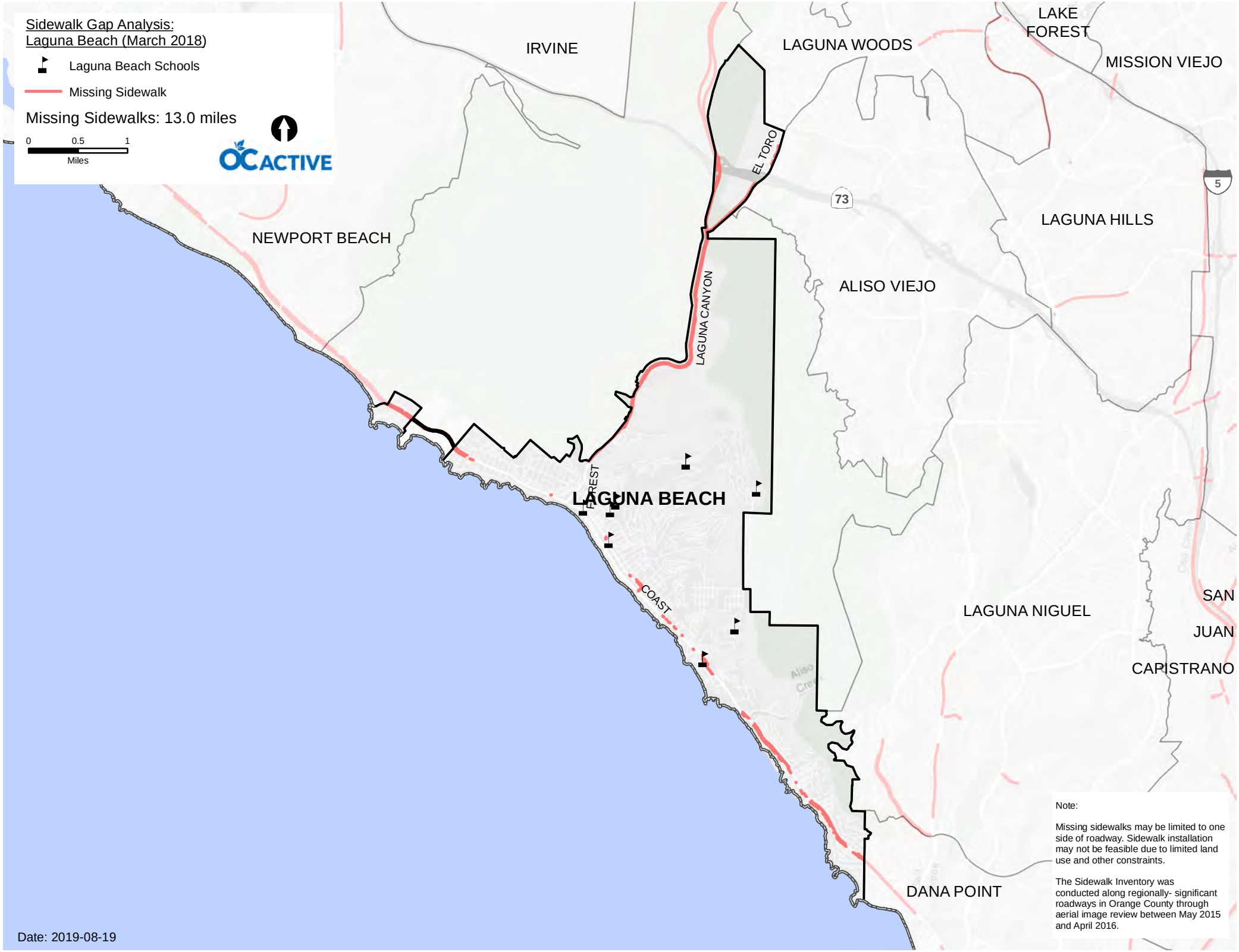

GARDEN GROVE
SANTA ANA
WESTMINSTER
SEAL BEACH
HUNTINGTON BEACH
FOUNTAIN VALLEY
COSTA MESA
COUNTY OF ORANGE
NEWPORT BEACH
Unincorporated County of Orange
RANCHO
BOLSA
ARGOSY
MCFADDEN
CENTER
EDINGER
HEIL
WARNER
SLATER
TALBERT
ELLIS
GARFIELD
YORKTOWN
ADAMS
INDIANAPOLIS
ATLANTA
HAMILTON
BANNING
SAYBROOK
ALGONQUIN
BOLSA CHICA
GRAHAM
SPRINGDALE
NEWLAND
EDWARDS
GOLDENWEST
GOTHARD
BEACH
MAIN
DELAWARE
LAKE
MAGNOLIA
BUSHARD
BROOKHURST
WARD
SEAPOINT
PALM
ORANGE
17TH
6TH
1ST
PACIFIC COAST
405
Sidewalk Gap Analysis: Huntington Beach (March 2018)
Huntington Beach Schools
Golden West Transit Center/ Park and Ride
Missing Sidewalk
Unincorporated County of Orange
0 0.55 1.1
Miles
OCACTIVE
Missing Sidewalks: 18.2 miles
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16

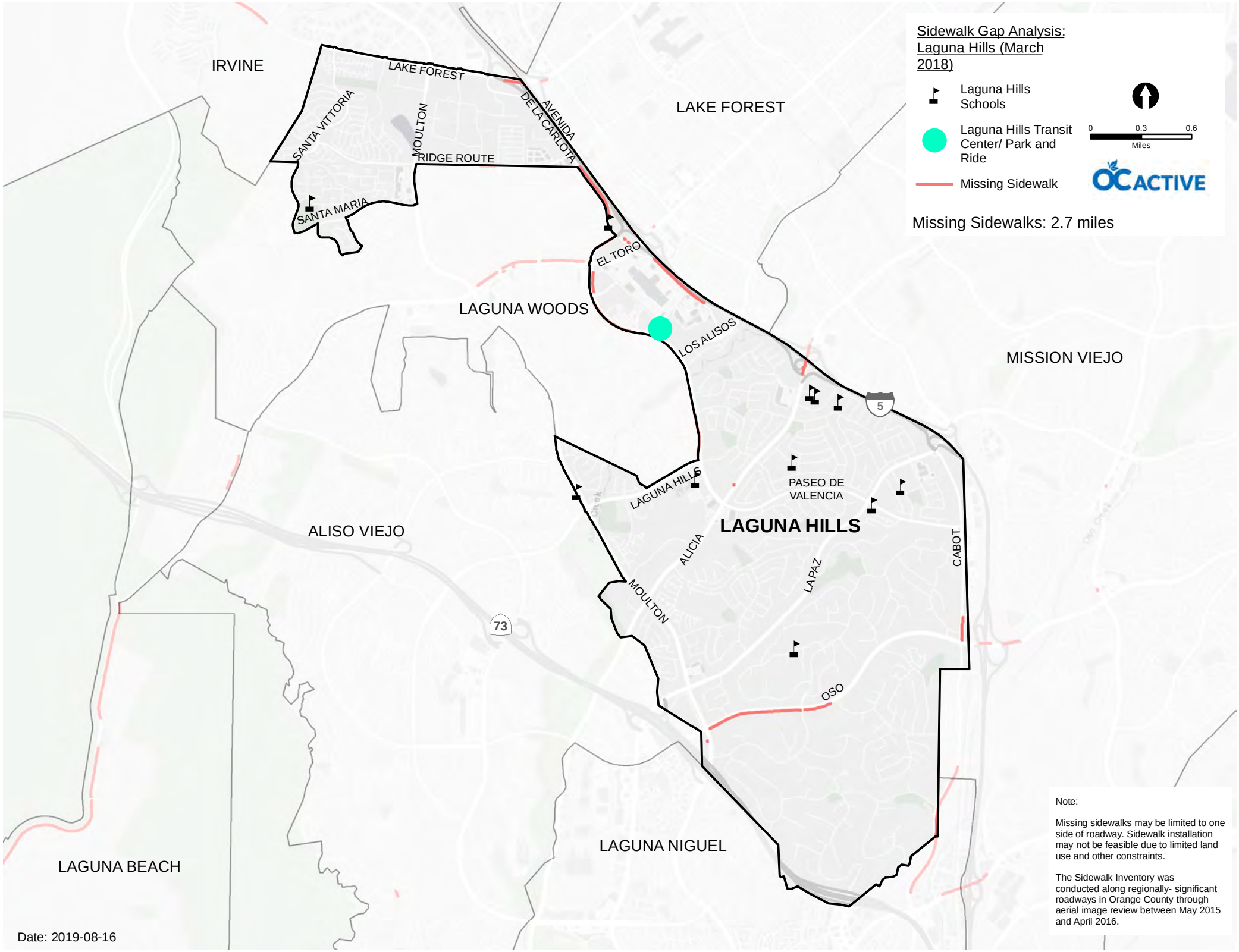


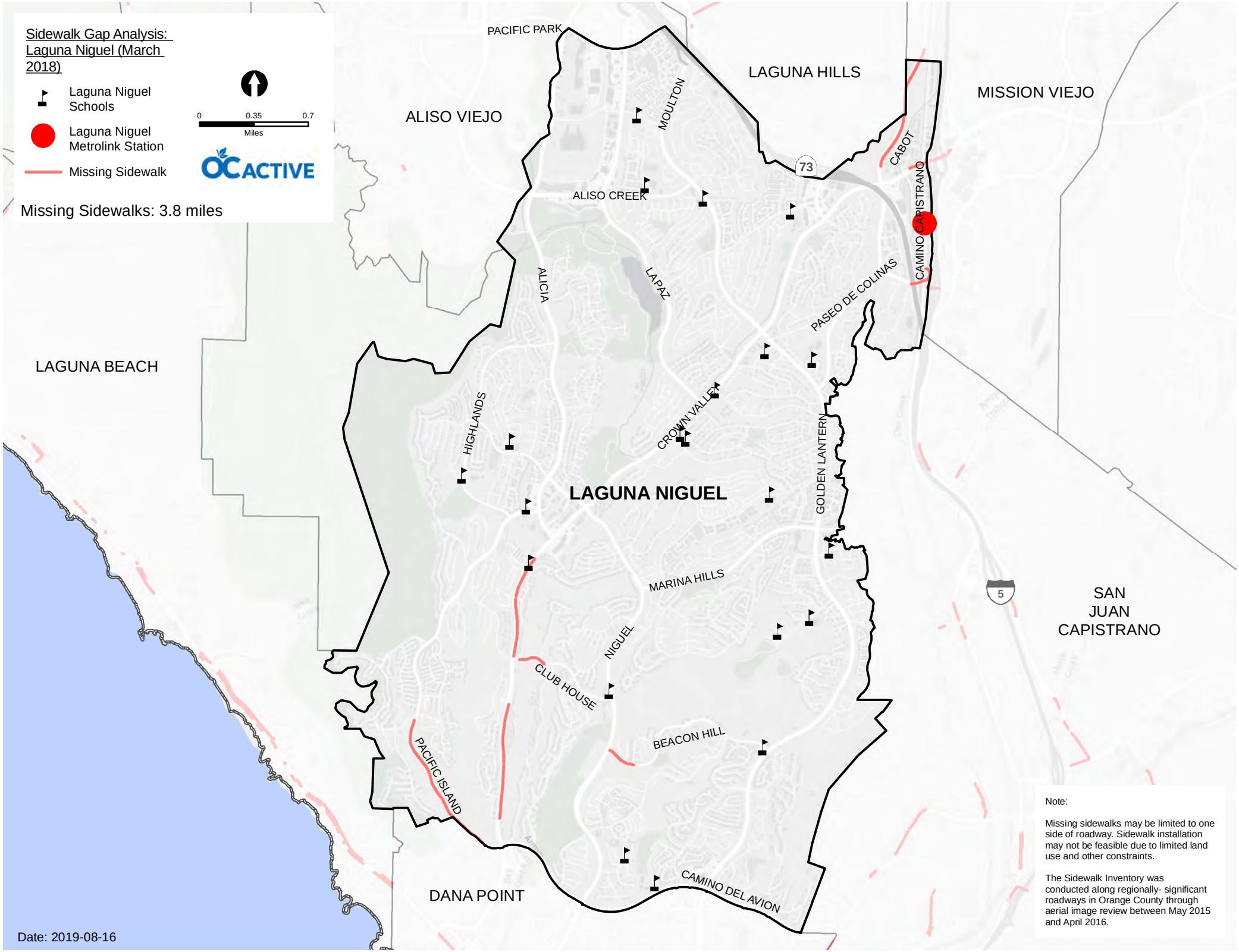
Note:

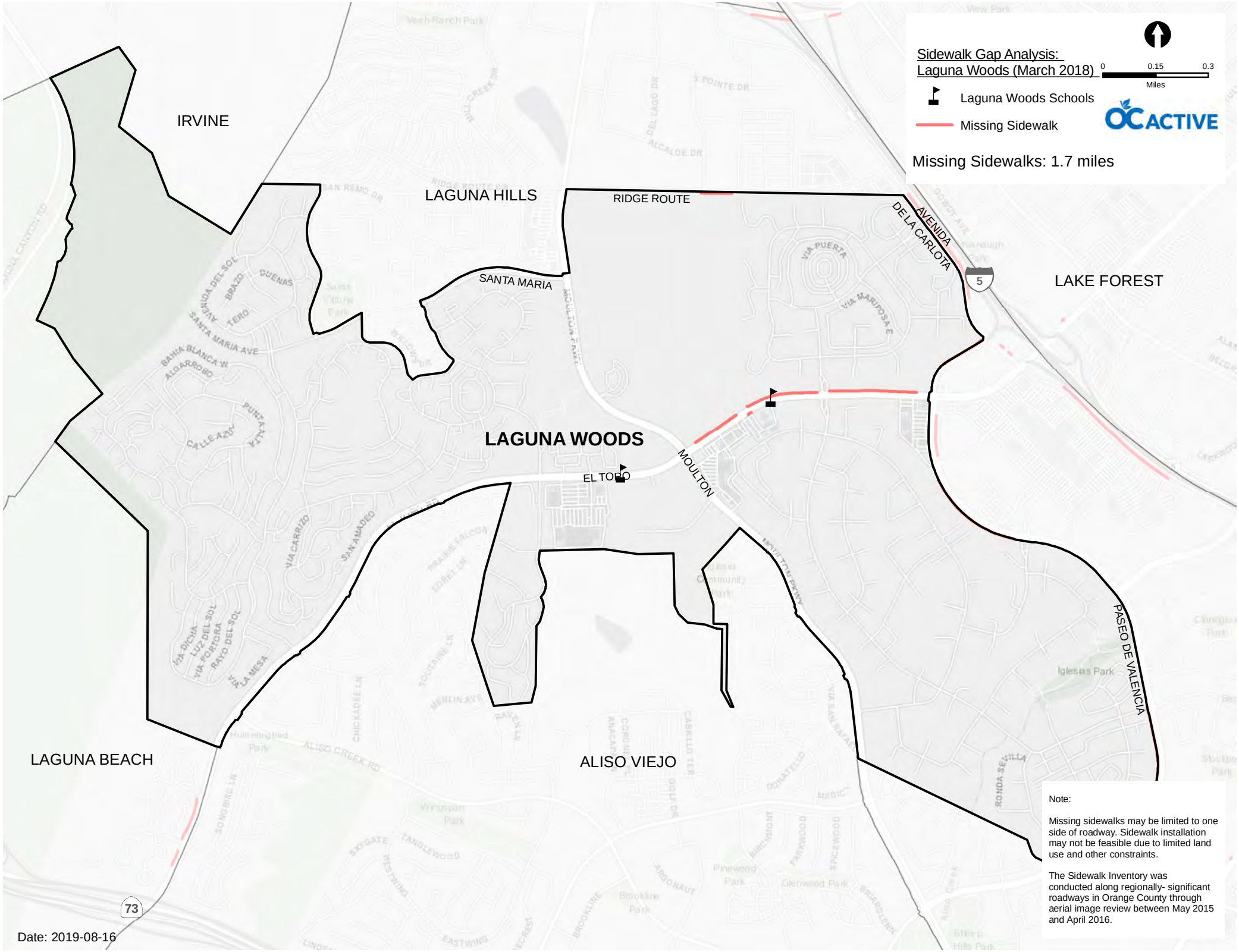
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.

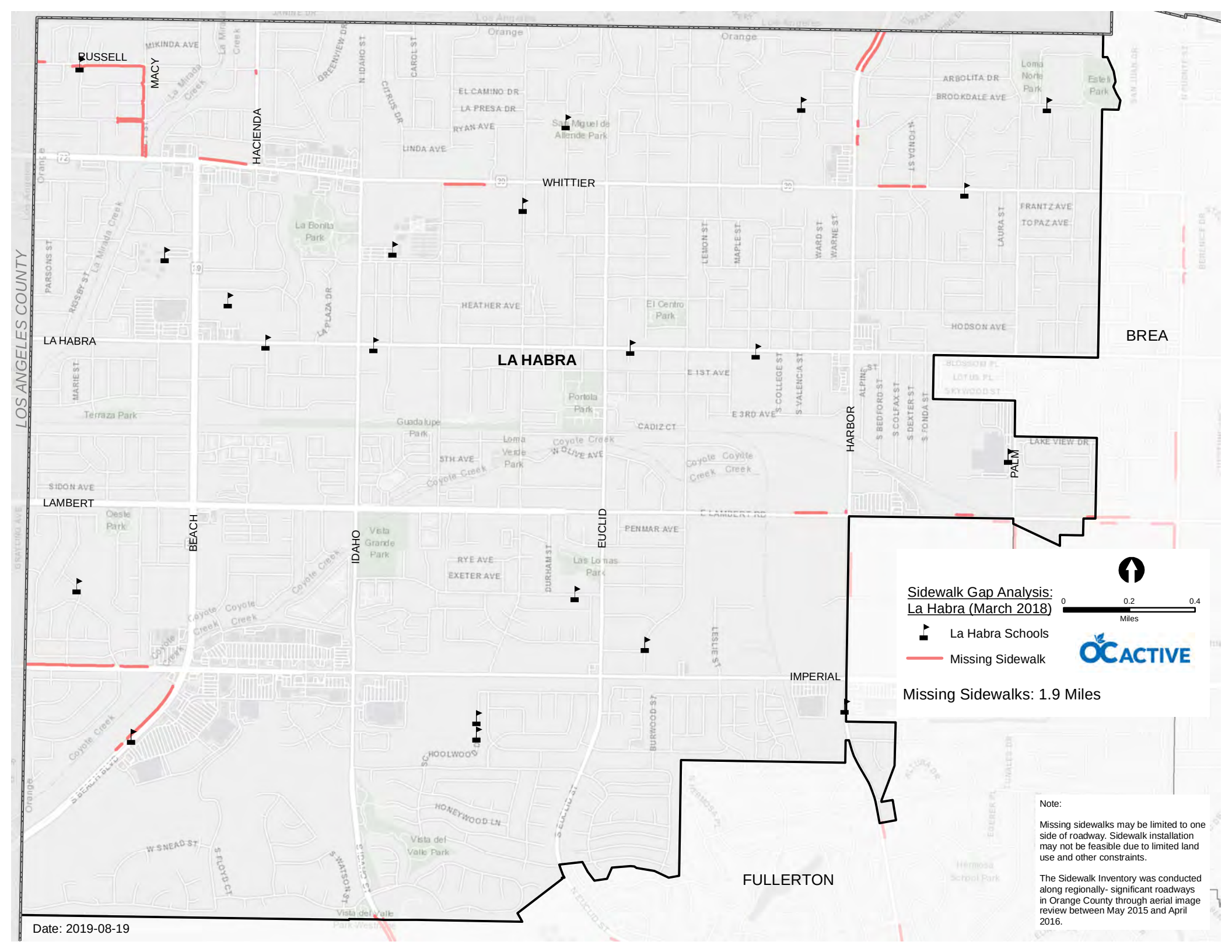
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.

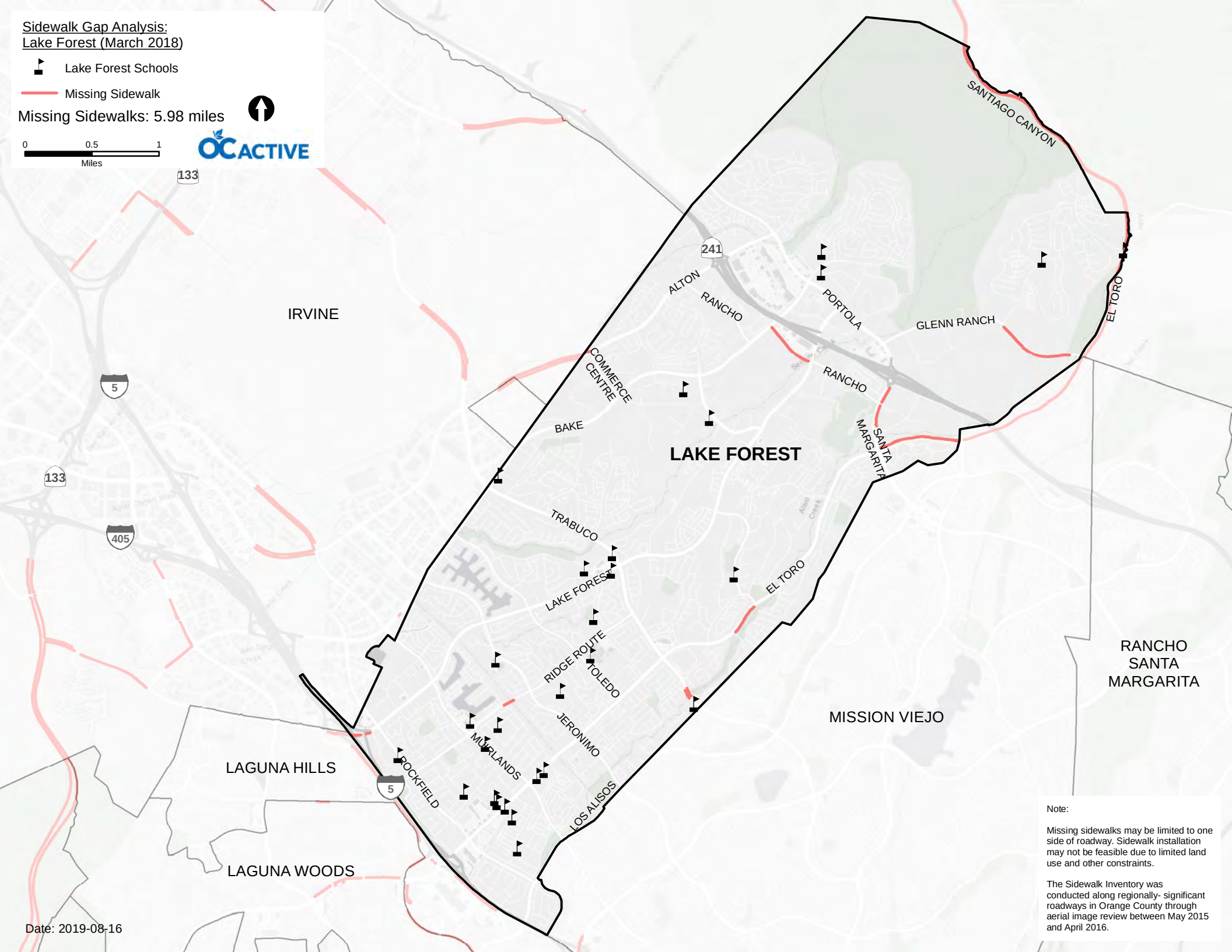

Sidewalk Gap Analysis:
Laguna Beach (March 2018)
Laguna Beach Schools
Missing Sidewalk
Missing Sidewalks: 13.0 miles
0
0.5
1
Miles
OCACTIVE
IRVINE
LAGUNA WOODS
LAKE FOREST
MISSION VIEJO
EL TORO
73
5
LAGUNA HILLS
NEWPORT BEACH
LAGUNA CANYON
ALISO VIEJO
LAGUNA BEACH
COAST
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
DANA POINT
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-19

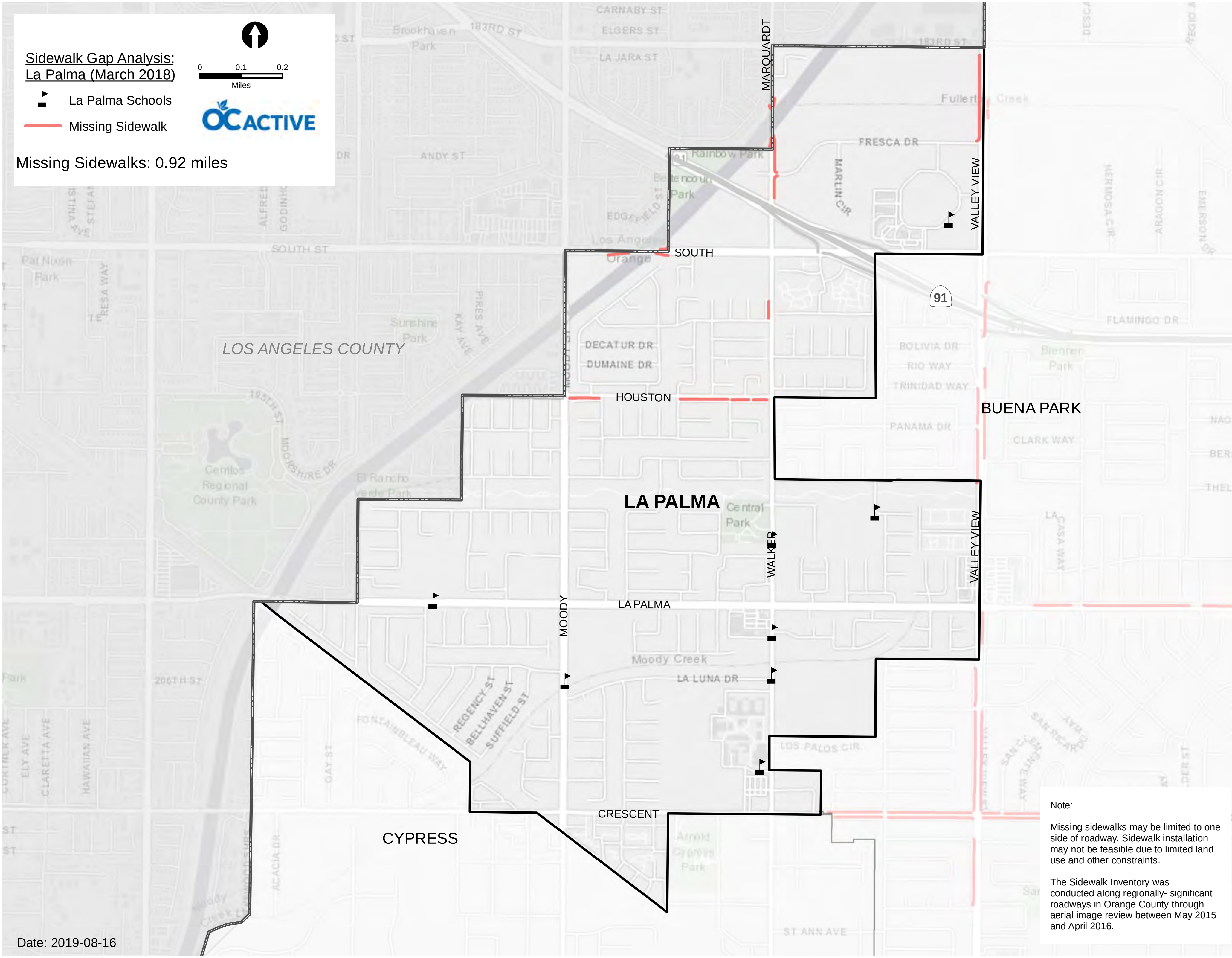

Sidewalk Gap Analysis:
Laguna Hills (March 2018)
Laguna Hills Schools
Laguna Hills Transit Center/ Park and Ride
Missing Sidewalk
0 0.3 0.6
Miles
OCACTIVE
Missing Sidewalks: 2.7 miles
IRVINE
LAKE FOREST
LAGUNA WOODS
MISSION VIEJO
ALISO VIEJO
LAGUNA HILLS
LAGUNA NIGUEL
LAGUNA BEACH
LAKE FOREST
SANTA VITTORIA
MOULTON
AVENIDA DE LA CARLOTA
RIDGE ROUTE
SANTA MARIA
EL TORO
LOS ALISOS
LAGUNA HILLS
PASEO DE VALENCIA
ALICIA
LA PAZ
CABOT
MOULTON
OSO
5
73
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

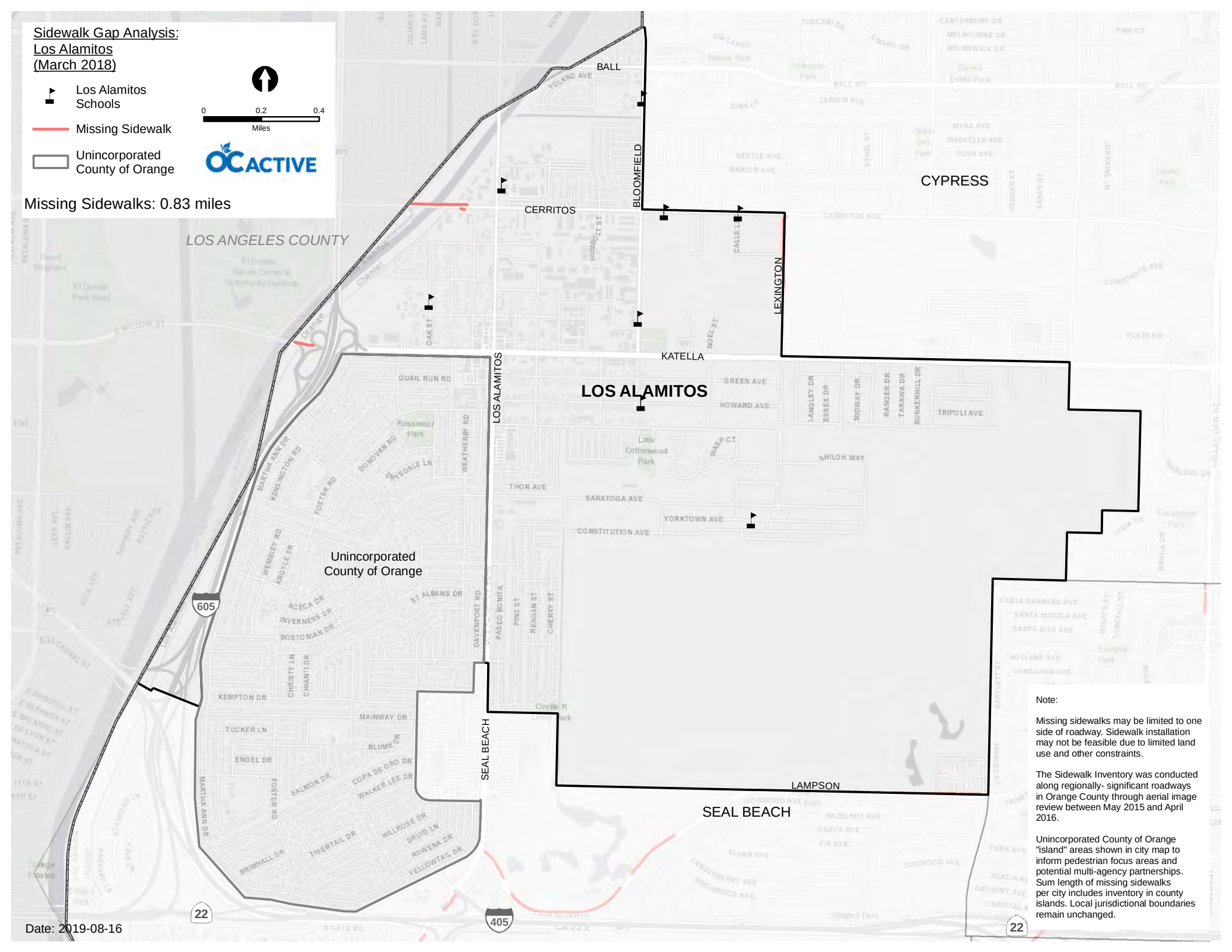

Sidewalk Gap Analysis: Laguna Niguel (March 2018)
Laguna Niguel Schools
Laguna Niguel Metrolink Station
Missing Sidewalk
0
0.35
0.7
Miles
OCACTIVE
Missing Sidewalks: 3.8 miles
PACIFIC PARK
LAGUNA HILLS
MISSION VIEJO
ALISO VIEJO
MOULTON
CABOT
73
ALISO CREEK
CAMINO CAPISTRANO
ALICIA
LA PAZ
PASEO DE COLINAS
LAGUNA BEACH
HIGHLANDS
CROWN VALLEY
GOLDEN LANTERN
LAGUNA NIGUEL
MARINA HILLS
5
SAN JUAN CAPISTRANO
NIGUEL
CLUB HOUSE
BEACON HILL
PACIFIC ISLAND
CAMINO DEL AVION
DANA POINT
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.

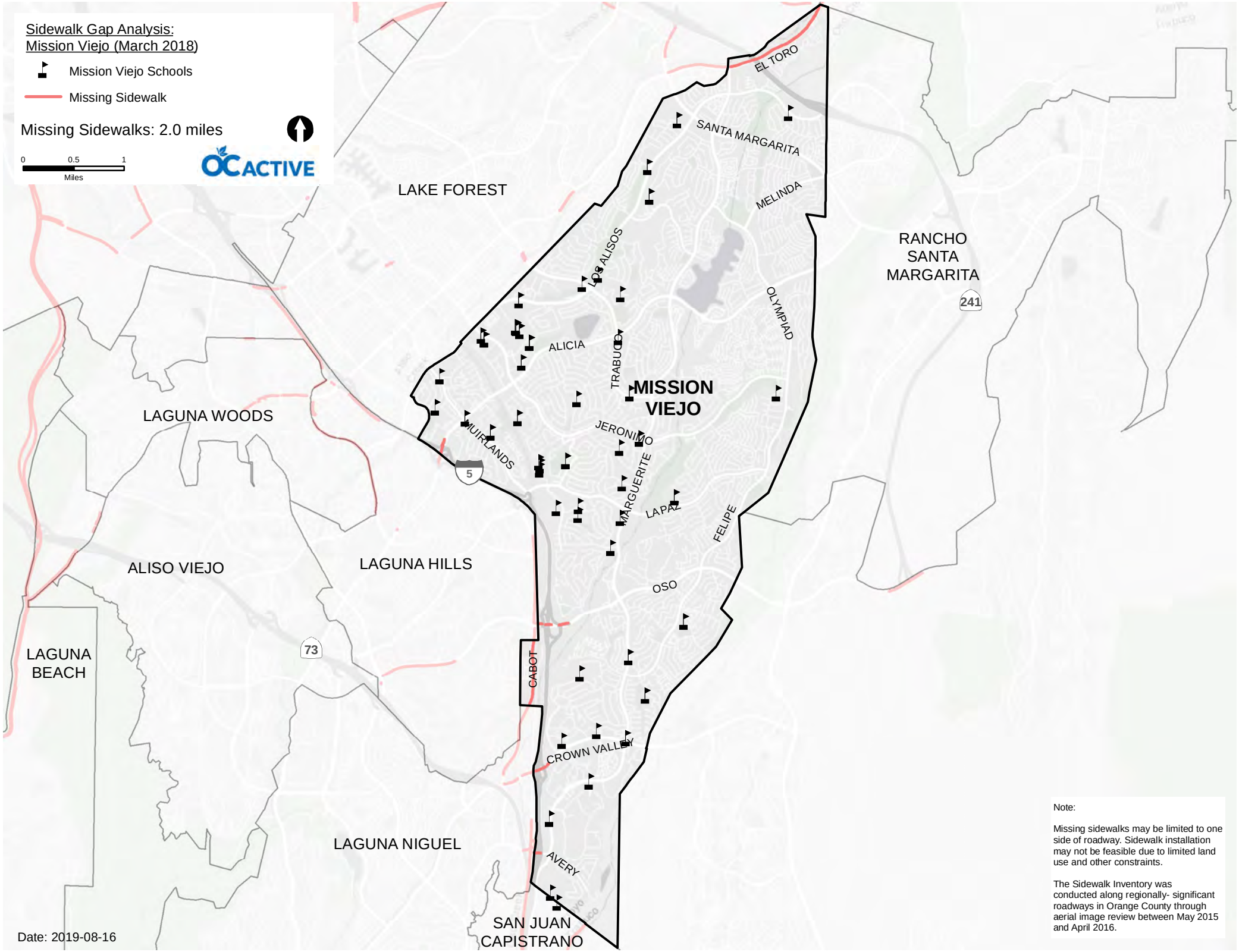

Sidewalk Gap Analysis:
Laguna Woods (March 2018)
0
0.15
0.3
Miles
Laguna Woods Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 1.7 miles
IRVINE
LAGUNA HILLS
RIDGE ROUTE
AVENIDA DE LA CARLOTA
LAKE FOREST
SANTA MARIA
LAGUNA WOODS
EL TORO
MOULTON
PASEO DE VALENCIA
LAGUNA BEACH
ALISO VIEJO
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

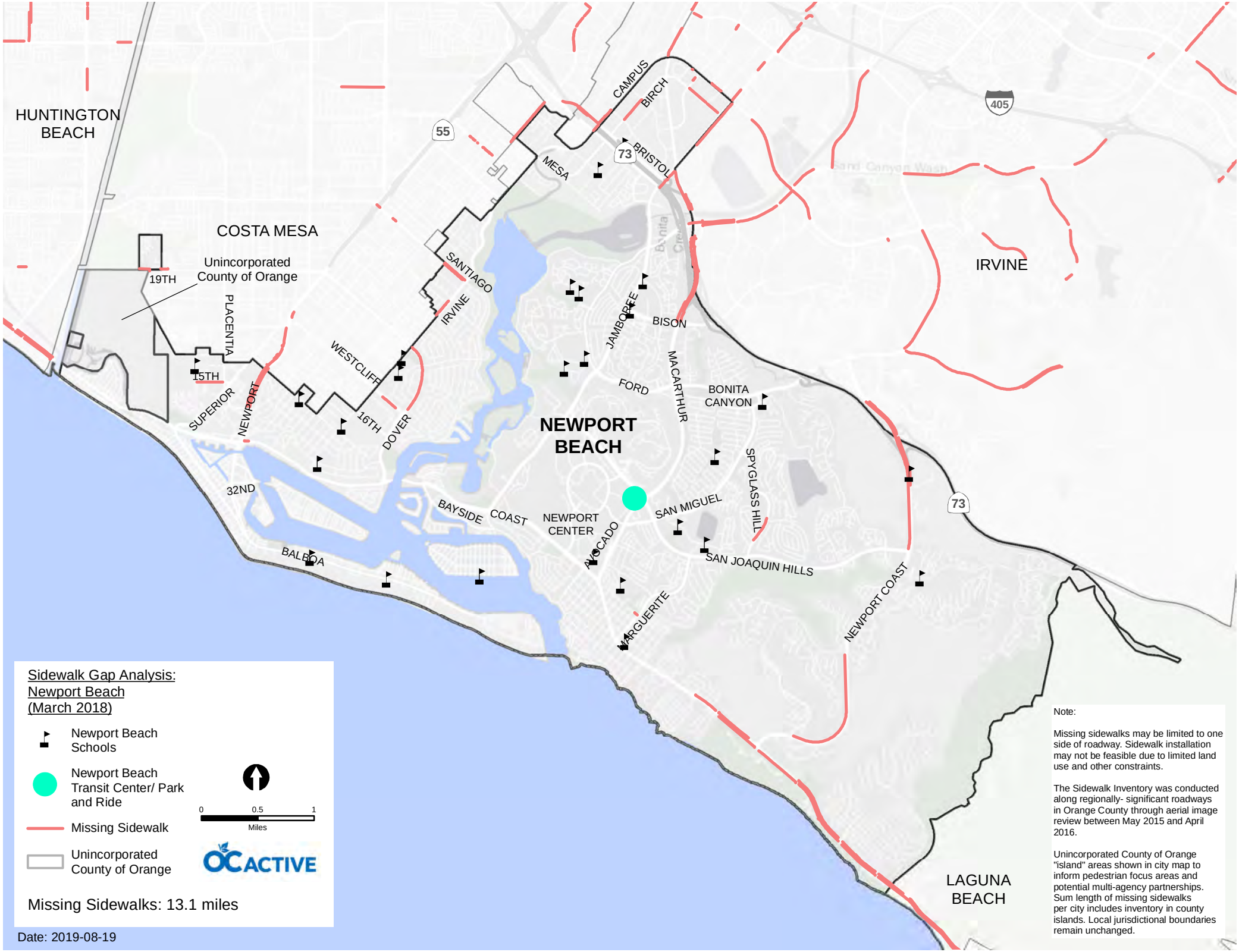

Sidewalk Gap Analysis:
La Habra (March 2018)
0
0.2
0.4
Miles
La Habra Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 1.9 Miles
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-19
LOS ANGELES COUNTY
LA HABRA
WHITTIER
BREA
FULLERTON
IMPERIAL
LAMBERT
RUSSELL
MACY
HACIENDA
BEACH
IDAHO
EUCLID
HARBOR
PALM
EL CAMINO DR
LA PRESA DR
RYAN AVE
LINDA AVE
HEATHER AVE
HODSON AVE
E 1ST AVE
E 3RD AVE
CADIZ CT
PENMAR AVE
RYE AVE
EXETER AVE
HONEYWOOD LN
W SNEAD ST
La Bonita Park
El Centro Park
Portola Park
Guadalupe Park
Loma Verde Park
Vista Grande Park
Las Lomas Park
Terraza Park
Oeste Park
Vista del Valle Park
Coyote Creek

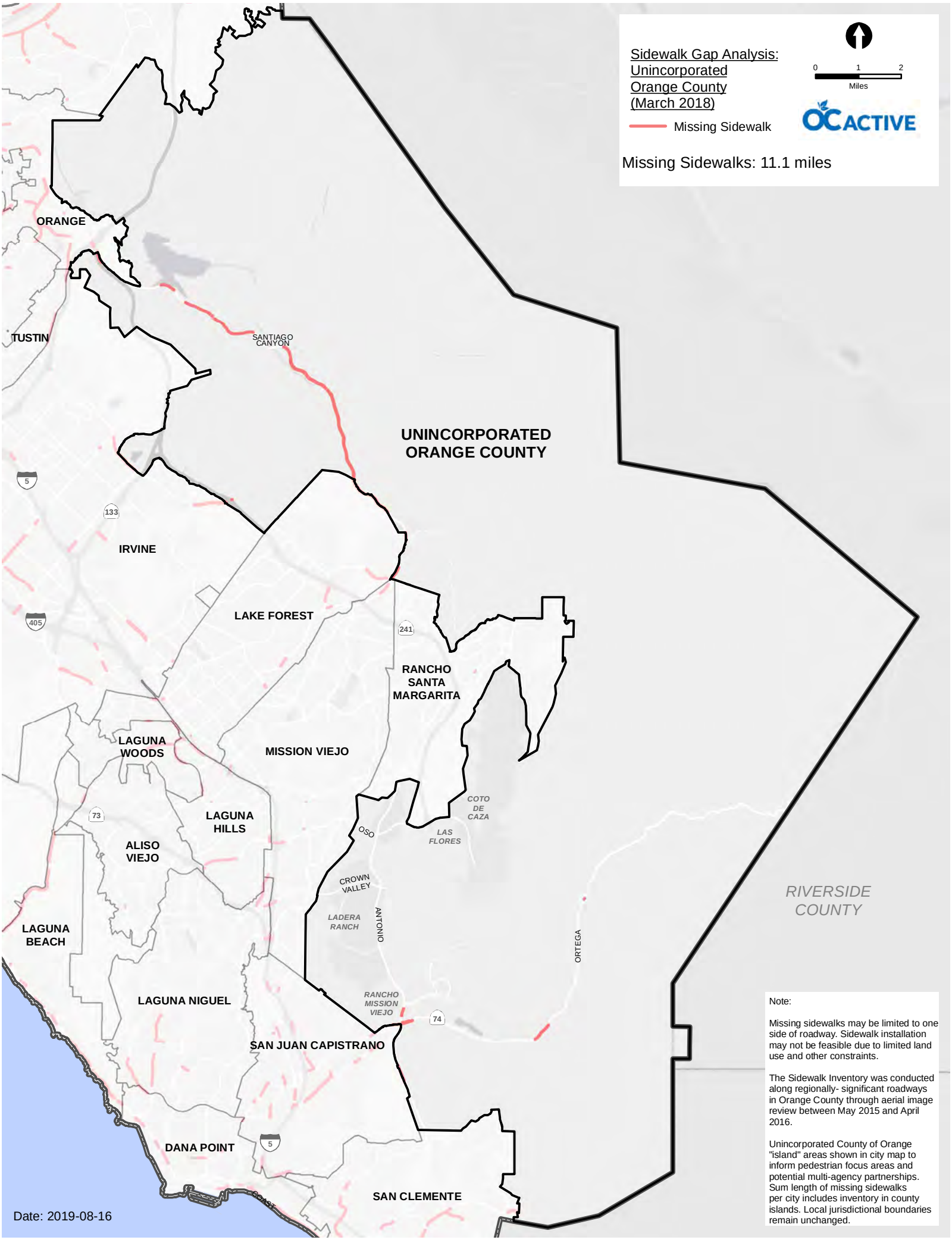

Sidewalk Gap Analysis:
Lake Forest (March 2018)
Lake Forest Schools
Missing Sidewalk
Missing Sidewalks: 5.98 miles
0
0.5
1
Miles
OCACTIVE
133
241
5
133
405
5
IRVINE
LAKE FOREST
LAGUNA HILLS
LAGUNA WOODS
MISSION VIEJO
RANCHO SANTA MARGARITA
SANTIAGO CANYON
EL TORO
ALTON
RANCHO
PORTOLA
GLENN RANCH
RANCHO
COMMERCE CENTRE
BAKE
SANTA MARGARITA
TRABUCO
LAKE FOREST
EL TORO
RIDGE ROUTE
TOLEDO
JERONIMO
MURLANDS
ROCKFIELD
LOS ALISOS
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

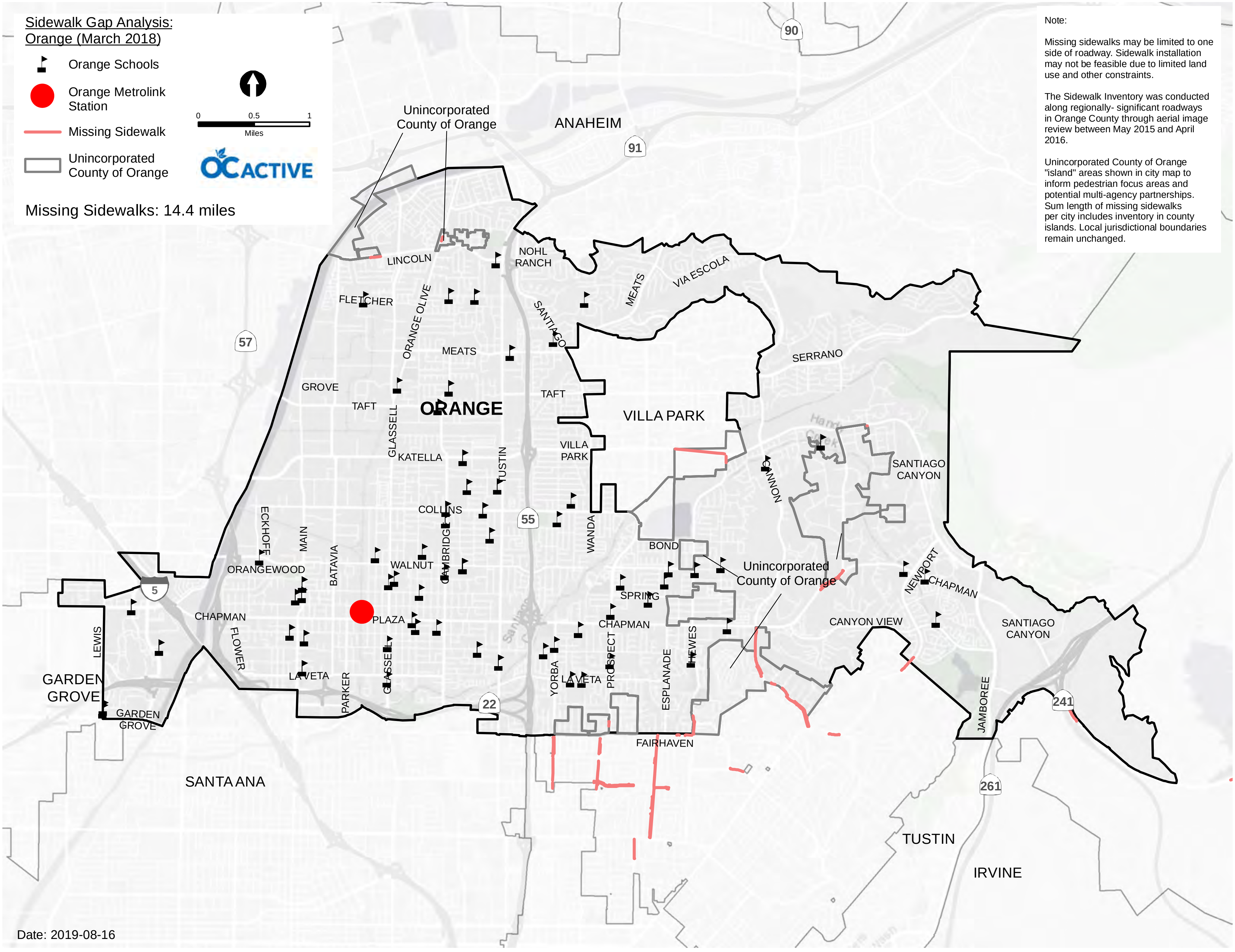

Sidewalk Gap Analysis:
La Palma (March 2018)
La Palma Schools
Missing Sidewalk
0 0.1 0.2
Miles
OC ACTIVE
Missing Sidewalks: 0.92 miles
LOS ANGELES COUNTY
LA PALMA
BUENA PARK
CYPRESS
MARQUARDT
SOUTH
HOUSTON
LA PALMA
MOODY
WALKER
VALLEY VIEW
CRESCENT
91
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

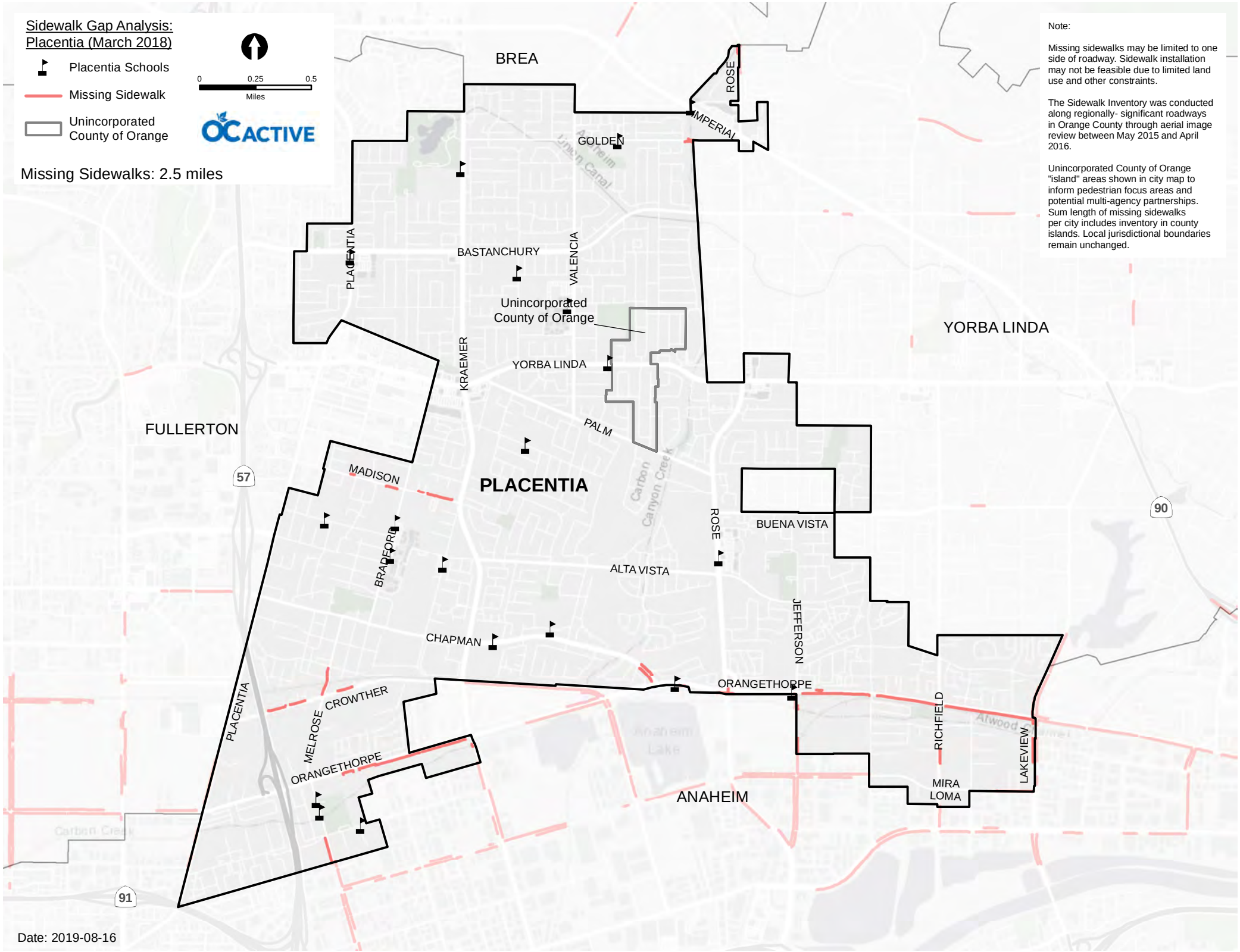

Sidewalk Gap Analysis:
Los Alamitos
(March 2018)
Los Alamitos Schools
Missing Sidewalk
Unincorporated County of Orange
0
0.2
0.4
Miles
OCACTIVE
Missing Sidewalks: 0.83 miles
LOS ANGELES COUNTY
BALL
CERRITOS
BLOOMFIELD
CYPRESS
LEXINGTON
KATELLA
LOS ALAMITOS
LOS ALAMITOS
Unincorporated County of Orange
SEAL BEACH
LAMPSON
605
22
405
22
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16

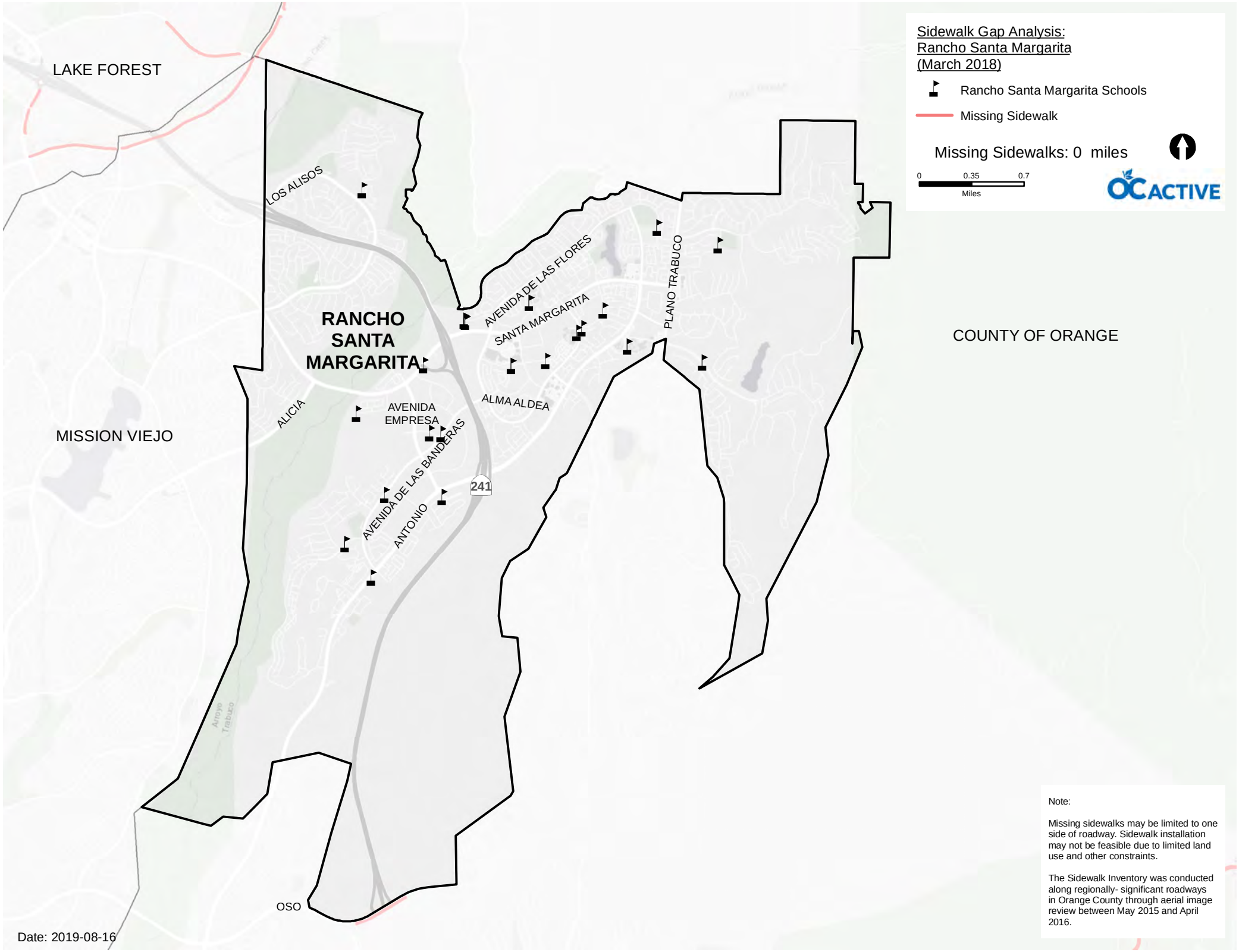

Sidewalk Gap Analysis:
Mission Viejo (March 2018)
Mission Viejo Schools
Missing Sidewalk
Missing Sidewalks: 2.0 miles
0
0.5
1
Miles
OCACTIVE
LAKE FOREST
RANCHO SANTA MARGARITA
241
EL TORO
SANTA MARGARITA
MELINDA
LOS ALISOS
OLYMPIAD
ALICIA
TRABUCO
MISSION VIEJO
JERONIMO
MARGUERITE
LAPAZ
FELIPE
MUIRLANDS
5
LAGUNA WOODS
ALISO VIEJO
LAGUNA HILLS
OSO
73
LAGUNA BEACH
CABOT
CROWN VALLEY
LAGUNA NIGUEL
AVERY
SAN JUAN CAPISTRANO
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

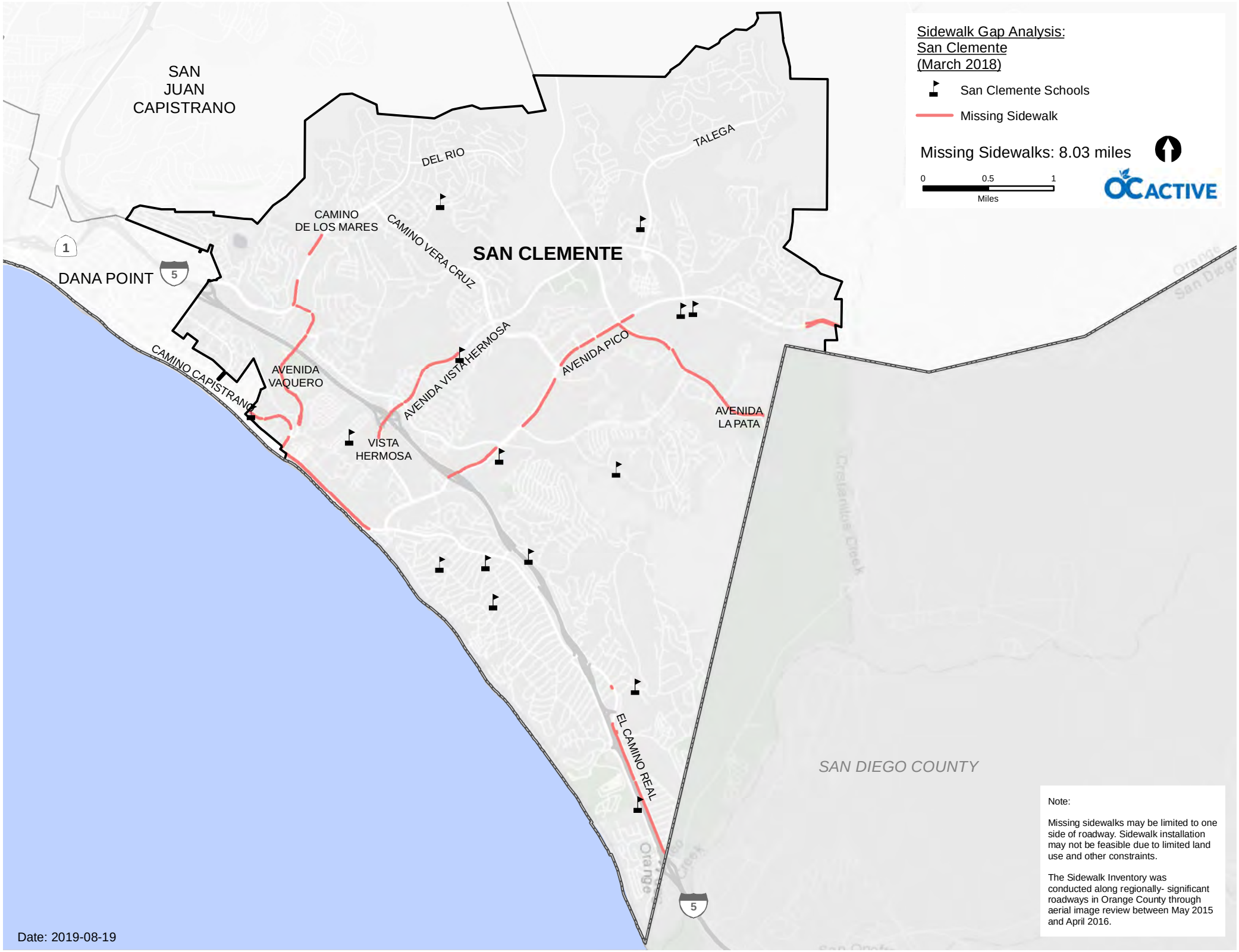

HUNTINGTON BEACH
COSTA MESA
Unincorporated County of Orange
19TH
PLACENTIA
15TH
SUPERIOR
NEWPORT
WESTCLIFF
16TH
DOVER
IRVINE
SANTIAGO
55
MESA
CAMPUS
BIRCH
73
BRISTOL
405
IRVINE
JAMBOREE
BISON
FORD
MACARTHUR
BONITA CANYON
NEWPORT BEACH
SPYGLASS HILL
SAN MIGUEL
32ND
BAYSIDE
COAST
NEWPORT CENTER
AVOCADO
SAN JOAQUIN HILLS
BALBOA
MARGUERITE
NEWPORT COAST
73
LAGUNA BEACH
Sidewalk Gap Analysis:
Newport Beach
(March 2018)
Newport Beach Schools
Newport Beach Transit Center/ Park and Ride
Missing Sidewalk
Unincorporated County of Orange
0
0.5
1
Miles
OCACTIVE
Missing Sidewalks: 13.1 miles
Date: 2019-08-19
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.

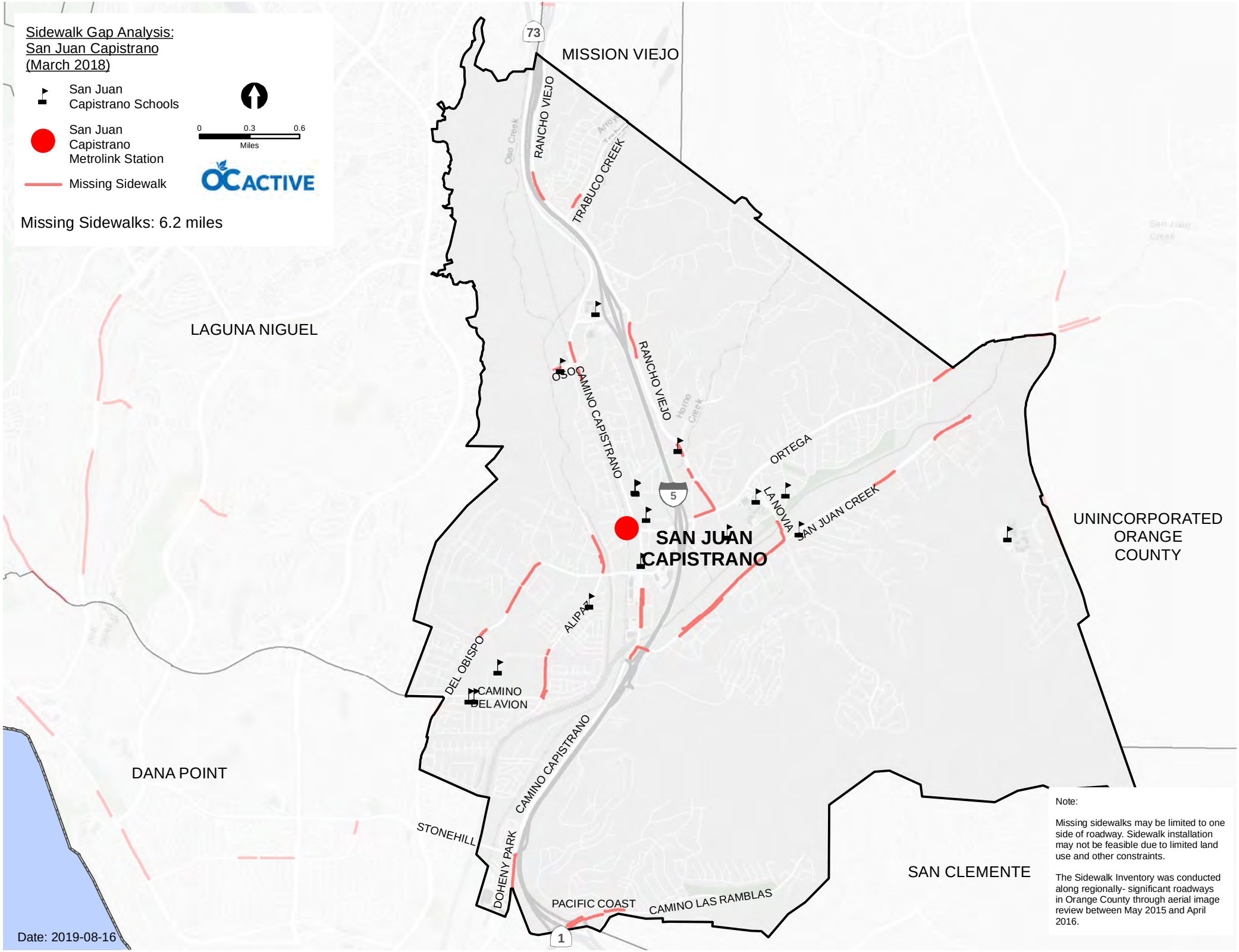

Sidewalk Gap Analysis:
Unincorporated
Orange County
(March 2018)
Missing Sidewalk
0 1 2
Miles
OCACTIVE
Missing Sidewalks: 11.1 miles
ORANGE
TUSTIN
SANTIAGO CANYON
UNINCORPORATED ORANGE COUNTY
IRVINE
LAKE FOREST
RANCHO SANTA MARGARITA
LAGUNA WOODS
MISSION VIEJO
LAGUNA HILLS
ALISO VIEJO
COTO DE CAZA
LAS FLORES
OSO
CROWN VALLEY
LADERA RANCH
ANTONIO
ORTEGA
RIVERSIDE COUNTY
LAGUNA BEACH
LAGUNA NIGUEL
RANCHO MISSION VIEJO
SAN JUAN CAPISTRANO
DANA POINT
SAN CLEMENTE
5
133
405
241
73
74
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16

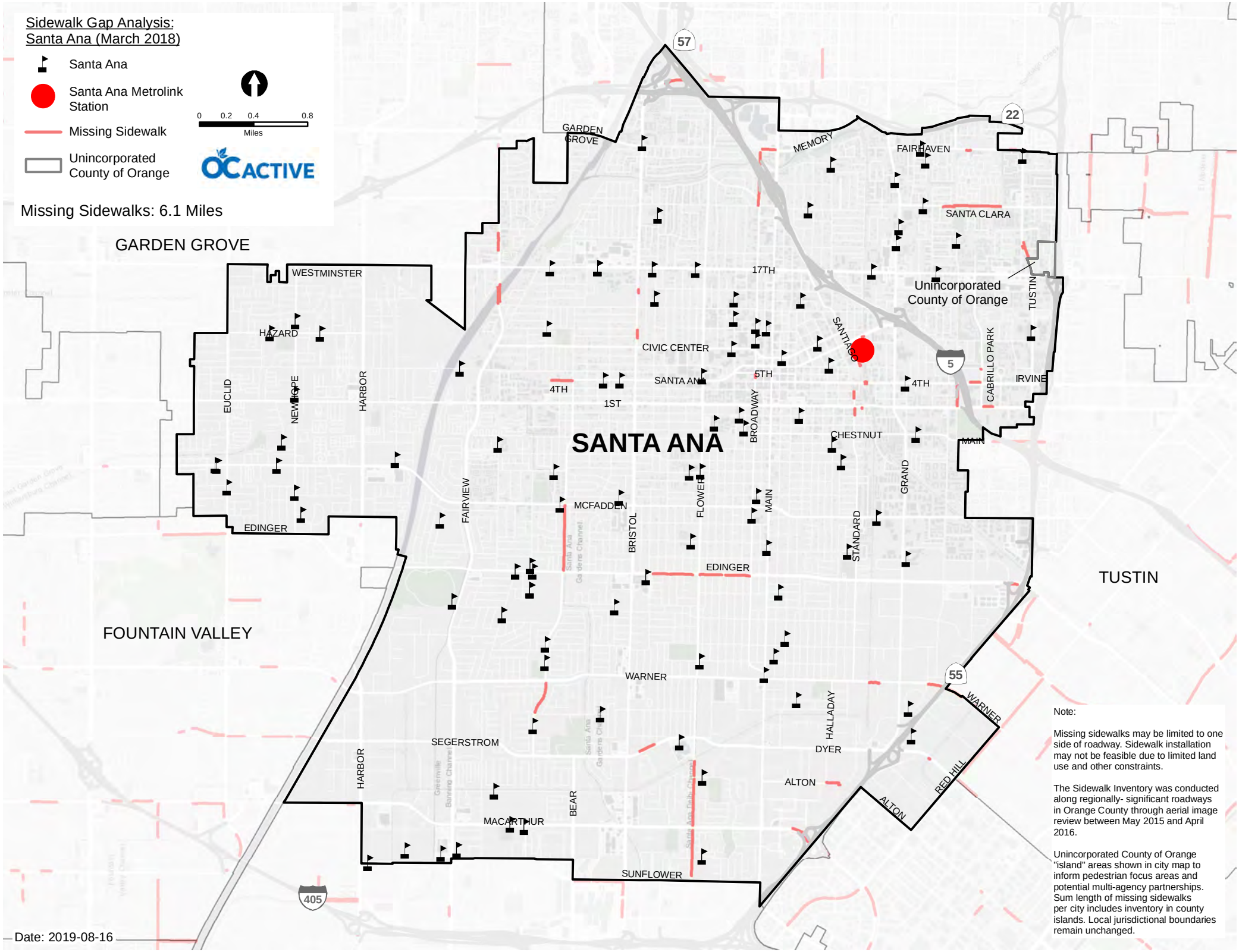

Sidewalk Gap Analysis:
Orange (March 2018)
Orange Schools
Orange Metrolink Station
Missing Sidewalk
Unincorporated County of Orange
0
0.5
1
Miles
Missing Sidewalks: 14.4 miles
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Unincorporated County of Orange
ANAHEIM
90
91
57
55
22
5
241
261
ORANGE
VILLA PARK
SANTIAGO CANYON
NOHL RANCH
GARDEN GROVE
SANTA ANA
TUSTIN
IRVINE
LINCOLN
FLETCHER
ORANGE OLIVE
MEATS
GROVE
TAFT
GLASSELL
KATELLA
TUSTIN
COLLINS
CAMBRIDGE
WALNUT
ECKHOFF
MAIN
BATAVIA
ORANGEWOOD
CHAPMAN
FLOWER
PLAZA
LA VETA
PARKER
LEWIS
SANTIAGO
VIA ESCOLA
SERRANO
VILLA PARK
WANDA
BOND
SPRING
CHAPMAN
PROSPECT
YORBA
ESPLANADE
HEWES
FAIRHAVEN
CANNON
NEWPORT
CANYON VIEW
JAMBOREE
Date: 2019-08-16

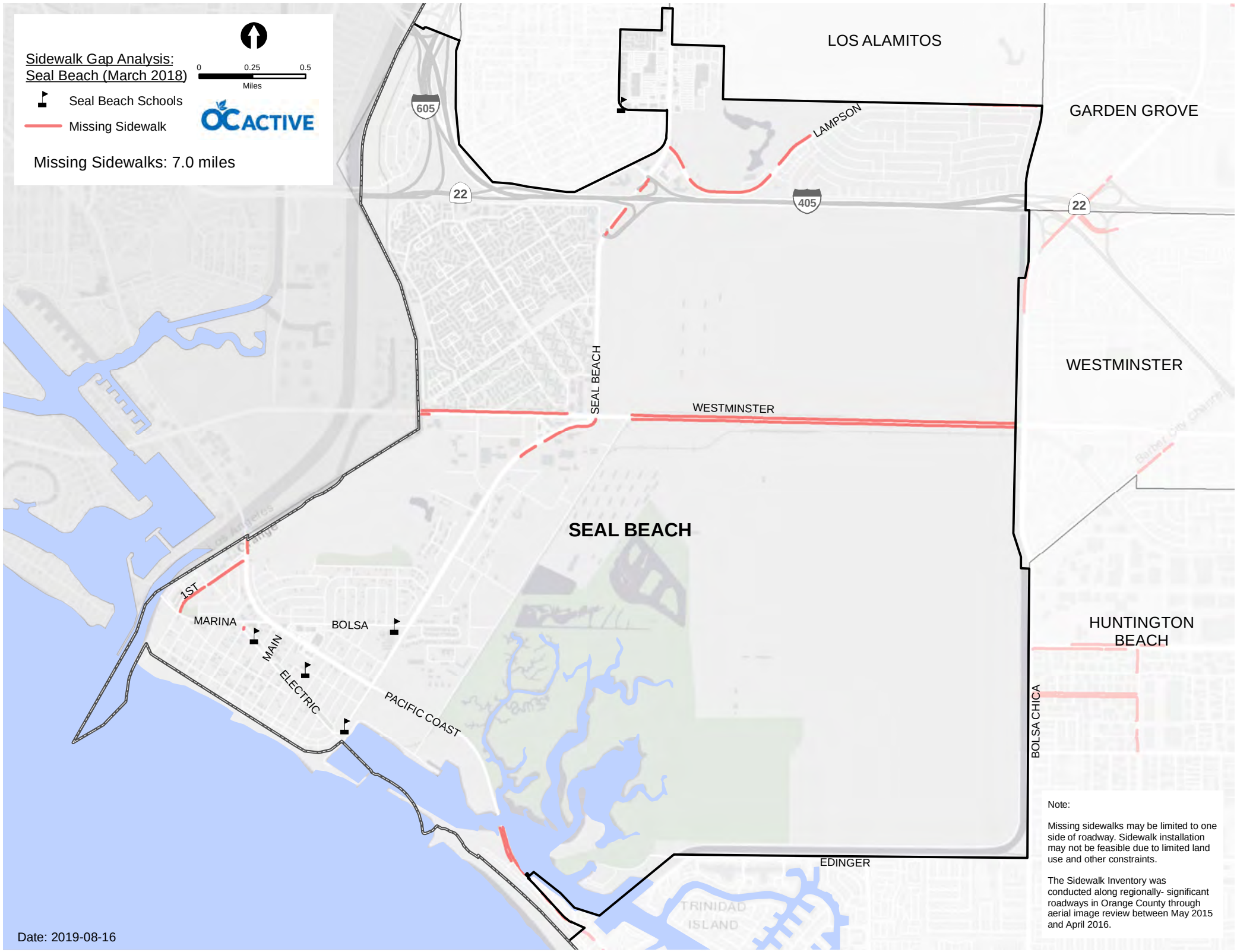

Sidewalk Gap Analysis:
Placentia (March 2018)
Placentia Schools
Missing Sidewalk
Unincorporated County of Orange
0
0.25
0.5
Miles
OCACTIVE
Missing Sidewalks: 2.5 miles
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
BREA
ROSE
IMPERIAL
GOLDEN
BASTANCHURY
PLACENTIA
VALENCIA
Unincorporated County of Orange
YORBA LINDA
KRAEMER
YORBA LINDA
FULLERTON
PALM
MADISON
PLACENTIA
BRADFORD
ROSE
BUENA VISTA
ALTA VISTA
JEFFERSON
CHAPMAN
ORANGETHORPE
PLACENTIA
CROWTHER
MELROSE
ORANGETHORPE
RICHFIELD
LAKEVIEW
MIRA LOMA
ANAHEIM
57
90
91
Date: 2019-08-16

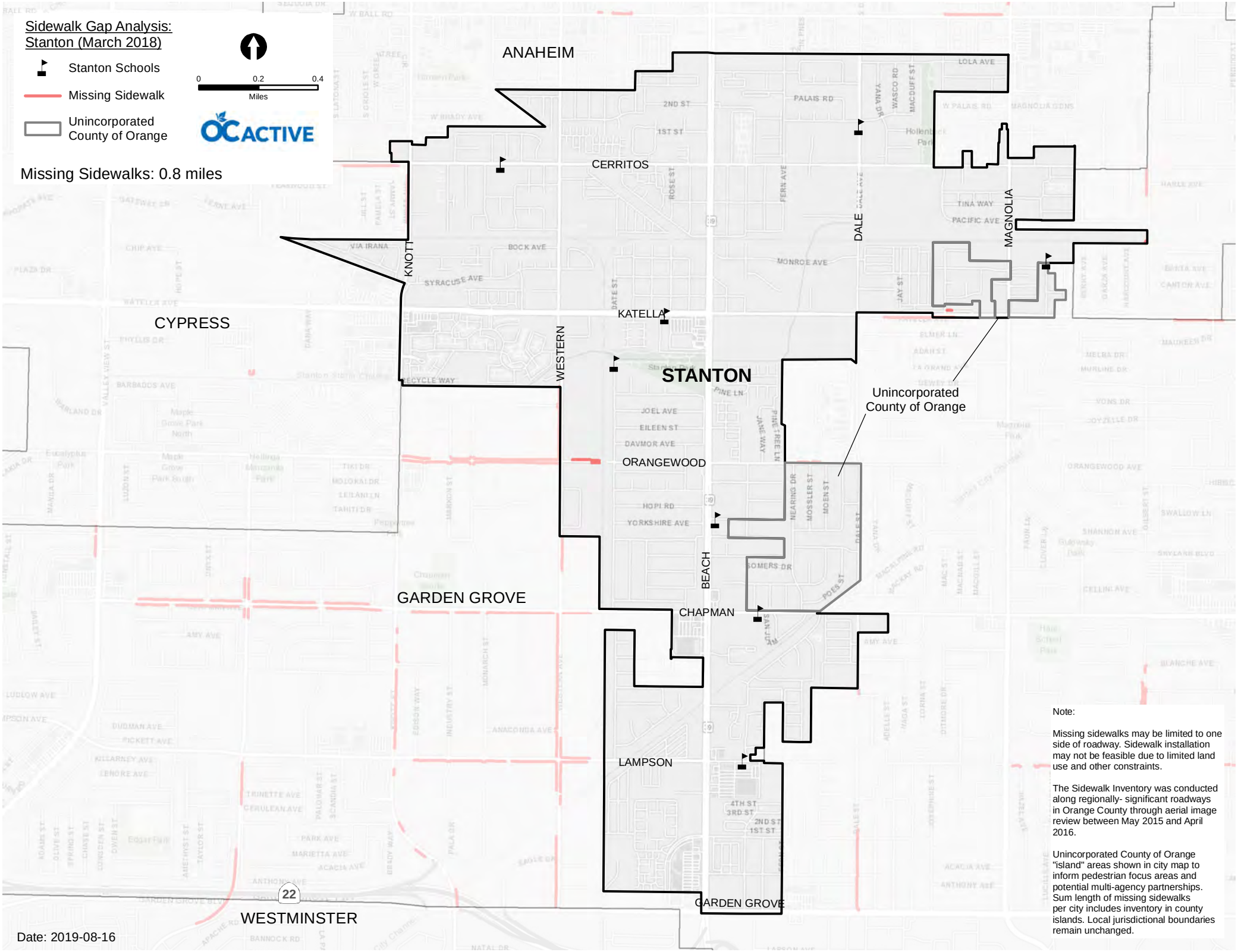

Sidewalk Gap Analysis:
Rancho Santa Margarita
(March 2018)
Rancho Santa Margarita Schools
Missing Sidewalk
Missing Sidewalks: 0 miles
0
0.35
0.7
Miles
OCACTIVE
LAKE FOREST
LOS ALISOS
RANCHO SANTA MARGARITA
AVENIDA DE LAS FLORES
SANTA MARGARITA
PLANO TRABUCO
COUNTY OF ORANGE
ALICIA
AVENIDA EMPRESA
ALMA ALDEA
MISSION VIEJO
AVENIDA DE LAS BANDERAS
ANTONIO
241
OSO
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.

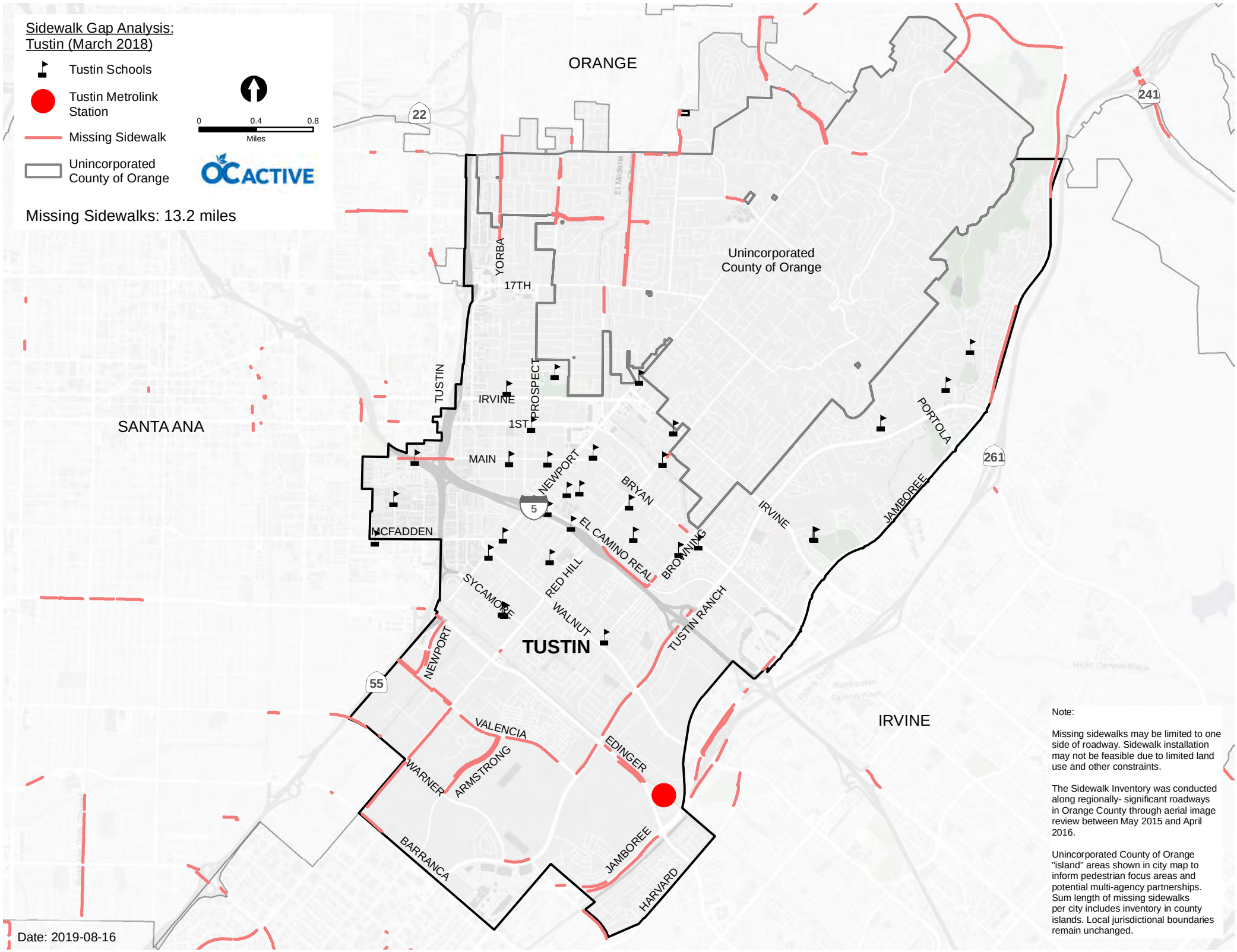

Sidewalk Gap Analysis:
San Clemente
(March 2018)
San Clemente Schools
Missing Sidewalk
Missing Sidewalks: 8.03 miles
0
0.5
1
Miles
OCACTIVE
SAN
JUAN
CAPISTRANO
DEL RIO
TALEGA
CAMINO
DE LOS MARES
CAMINO VERA CRUZ
SAN CLEMENTE
DANA POINT
1
5
CAMINO CAPISTRANO
AVENIDA
VAQUERO
AVENIDA VISTA HERMOSA
AVENIDA PICO
AVENIDA
LA PATA
VISTA
HERMOSA
EL CAMINO REAL
SAN DIEGO COUNTY
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-19

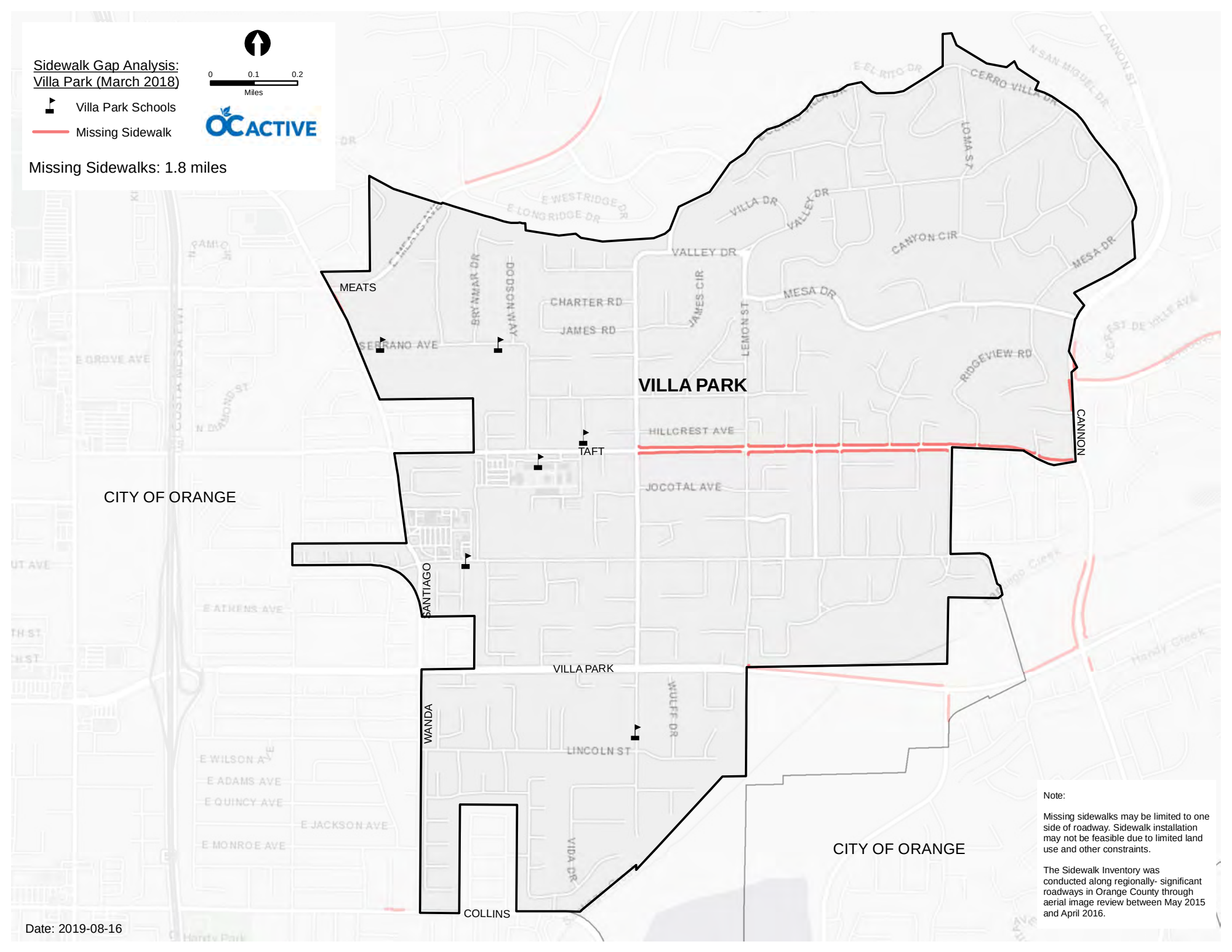

Sidewalk Gap Analysis:
San Juan Capistrano
(March 2018)
San Juan Capistrano Schools
San Juan Capistrano Metrolink Station
Missing Sidewalk
0 0.3 0.6
Miles
OCACTIVE
Missing Sidewalks: 6.2 miles
MISSION VIEJO
LAGUNA NIGUEL
DANA POINT
SAN CLEMENTE
UNINCORPORATED ORANGE COUNTY
SAN JUAN CAPISTRANO
RANCHO VIEJO
TRABUCO CREEK
CAMINO CAPISTRANO
ORTEGA
LA NOVIA
SAN JUAN CREEK
ALIPAZ
DEL OBISPO
CAMINO DEL AVION
STONEHILL
DOHENY PARK
PACIFIC COAST
CAMINO LAS RAMBLAS
73
5
1
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16

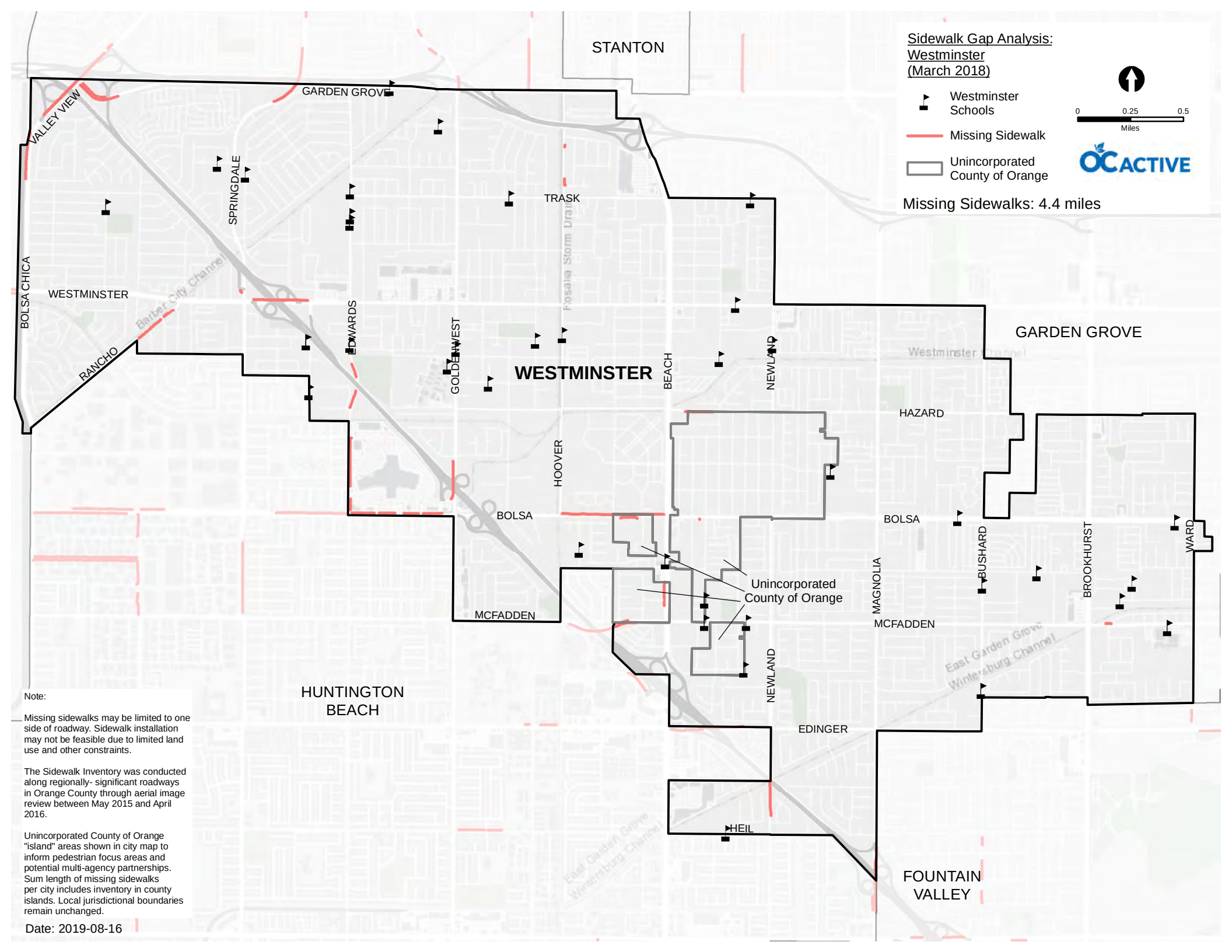

Sidewalk Gap Analysis:
Santa Ana (March 2018)
Santa Ana
Santa Ana Metrolink Station
Missing Sidewalk
Unincorporated County of Orange
0 0.2 0.4 0.8
Miles
OCACTIVE
Missing Sidewalks: 6.1 Miles
GARDEN GROVE
WESTMINSTER
HAZARD
EUCLID
NEWHOPE
HARBOR
EDINGER
FOUNTAIN VALLEY
SEGERSTROM
MACARTHUR
SUNFLOWER
405
57
GARDEN GROVE
MEMORY
22
FAIRHAVEN
SANTA CLARA
17TH
Unincorporated County of Orange
TUSTIN
CIVIC CENTER
SANTIAGO
5
CABRILLO PARK
IRVINE
4TH
1ST
SANTA ANA
5TH
4TH
BROADWAY
CHESTNUT
MAIN
SANTA ANA
FAIRVIEW
MCFADDEN
FLOWER
MAIN
GRAND
BRISTOL
STANDARD
EDINGER
TUSTIN
WARNER
HALLADAY
DYER
ALTON
RED HILL
ALTON
55
WARNER
BEAR
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16


Sidewalk Gap Analysis:
Seal Beach (March 2018)
0 0.25 0.5
Miles
Seal Beach Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 7.0 miles
LOS ALAMITOS
GARDEN GROVE
WESTMINSTER
HUNTINGTON BEACH
SEAL BEACH
605
22
405
LAMPSON
SEAL BEACH
WESTMINSTER
1ST
MARINA
MAIN
BOLSA
ELECTRIC
PACIFIC COAST
BOLSA CHICA
EDINGER
TRINIDAD ISLAND
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16


Sidewalk Gap Analysis:
Stanton (March 2018)
Stanton Schools
Missing Sidewalk
Unincorporated
County of Orange
0
0.2
0.4
Miles
OCACTIVE
Missing Sidewalks: 0.8 miles
ANAHEIM
CERRITOS
CYPRESS
KATELLA
STANTON
ORANGEWOOD
GARDEN GROVE
CHAPMAN
LAMPSON
WESTMINSTER
KNOTT
WESTERN
BEACH
DALE
MAGNOLIA
Unincorporated
County of Orange
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16


Sidewalk Gap Analysis:
Tustin (March 2018)
Tustin Schools
Tustin Metrolink Station
Missing Sidewalk
Unincorporated County of Orange
0
0.4
0.8
Miles
OCACTIVE
Missing Sidewalks: 13.2 miles
ORANGE
22
241
Unincorporated County of Orange
YORBA
17TH
TUSTIN
PROSPECT
IRVINE
1ST
MAIN
NEWPORT
BRYAN
5
MCFADDEN
EL CAMINO REAL
BROMMING
IRVINE
JAMBOREE
PORTOLA
261
SANTA ANA
SYCAMORE
RED HILL
WALNUT
TUSTIN
TUSTIN RANCH
NEWPORT
55
VALENCIA
EDINGER
WARNER
ARMSTRONG
BARRANCA
JAMBOREE
HARVARD
IRVINE
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.
Date: 2019-08-16


Sidewalk Gap Analysis:
Villa Park (March 2018)
0
0.1
0.2
Miles
Villa Park Schools
Missing Sidewalk
OCACTIVE
Missing Sidewalks: 1.8 miles
VILLA PARK
CITY OF ORANGE
CITY OF ORANGE
MEATS
TAFT
VILLA PARK
COLLINS
VALLEY DR
CHARTER RD
JAMES RD
SERRANO AVE
HILLCREST AVE
JOCOTAL AVE
LINCOLN ST
MESA DR
CANYON CIR
RIDGEVIEW RD
CANNON
SANTIAGO
WANDA
LEMON ST
JAMES CIR
VILLA DR
VALLEY DR
LOMA ST
CERRO VILLA DR
E EL RITO DR
E WESTRIDGE DR
E LONGRIDGE DR
BRYNMAR DR
DODSON WAY
WOLFF DR
VIDA DR
E GROVE AVE
N DIAMOND ST
E ATHENS AVE
E WILSON AVE
E ADAMS AVE
E QUINCY AVE
E JACKSON AVE
E MONROE AVE
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Date: 2019-08-16



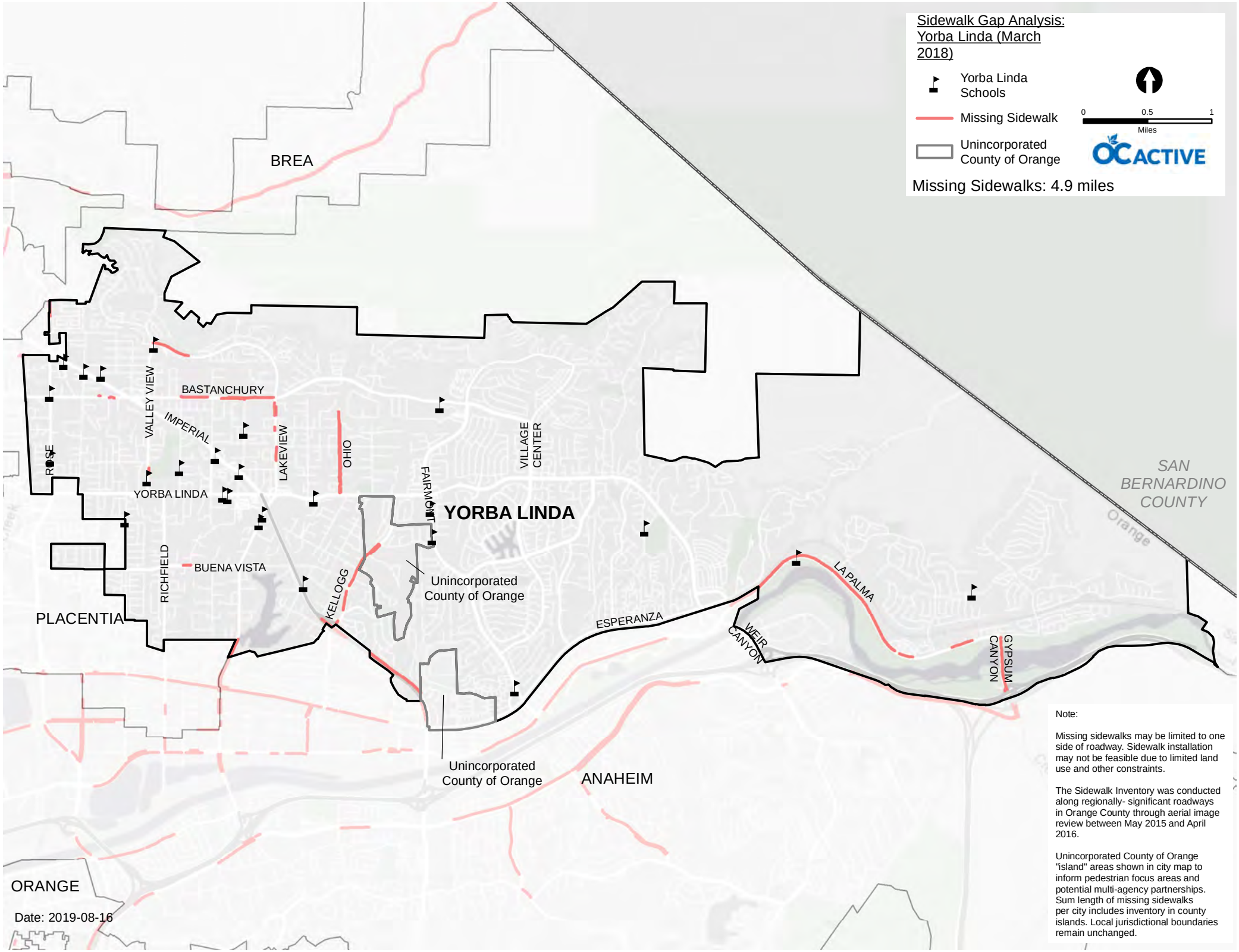
Note:

Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.

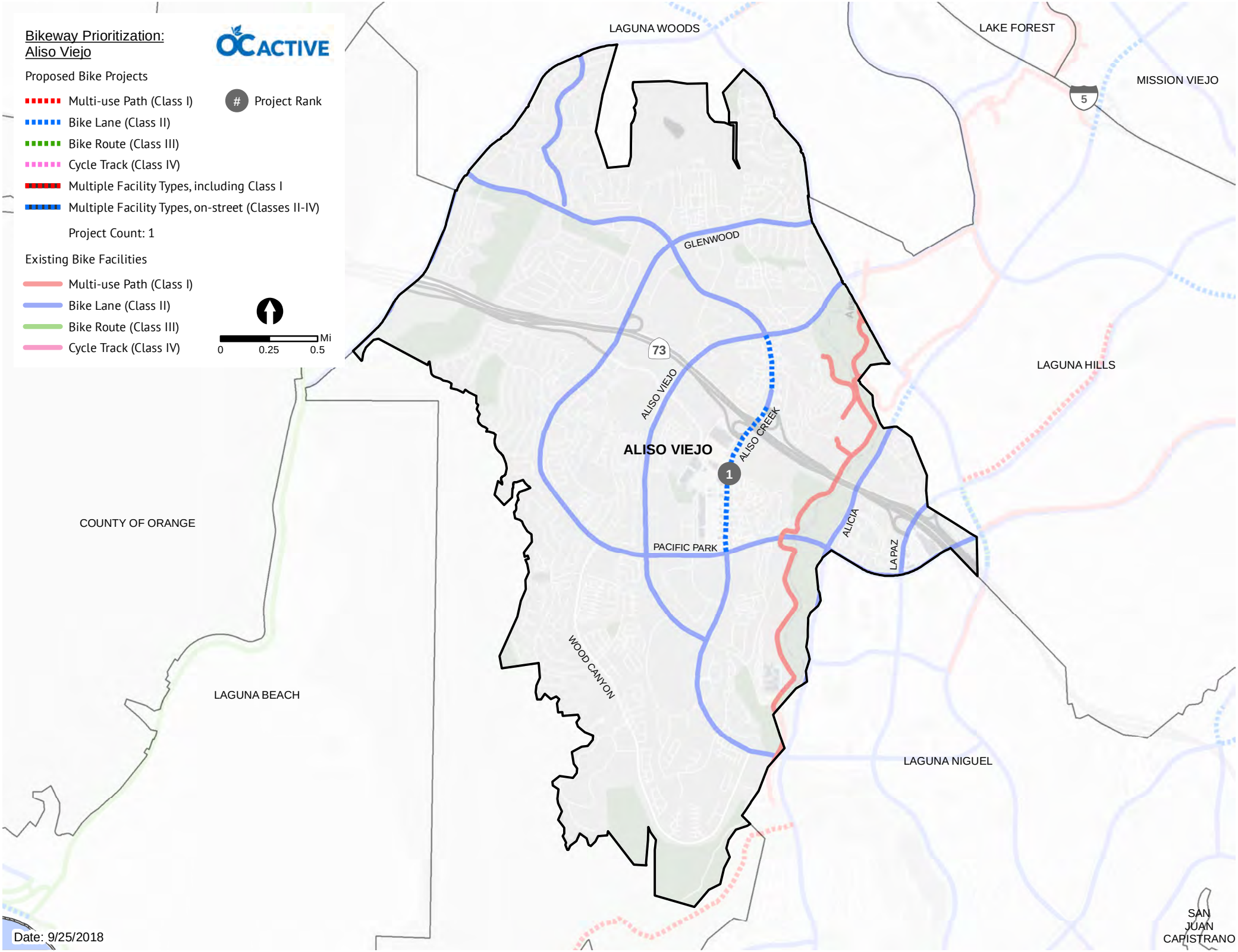
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.

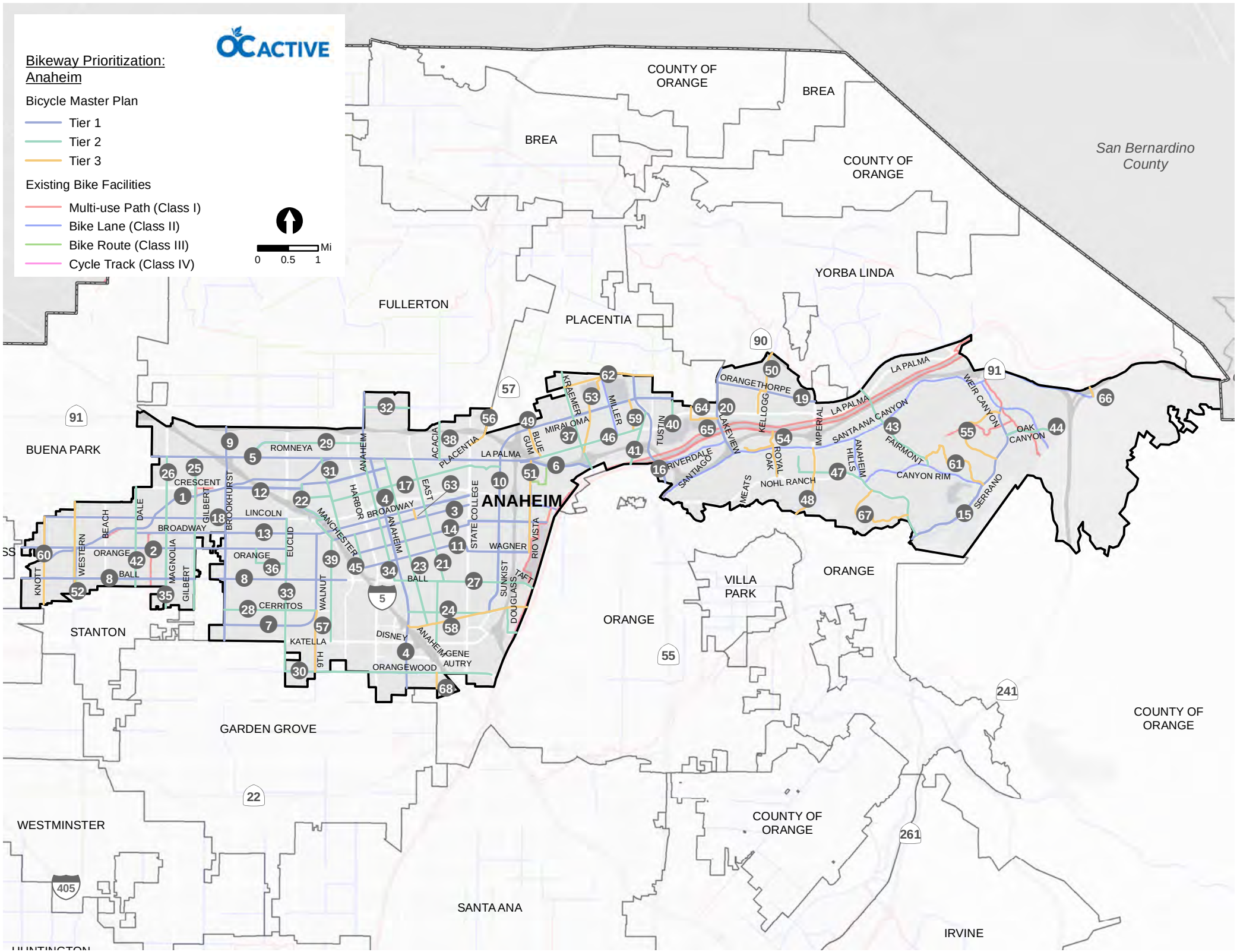
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.

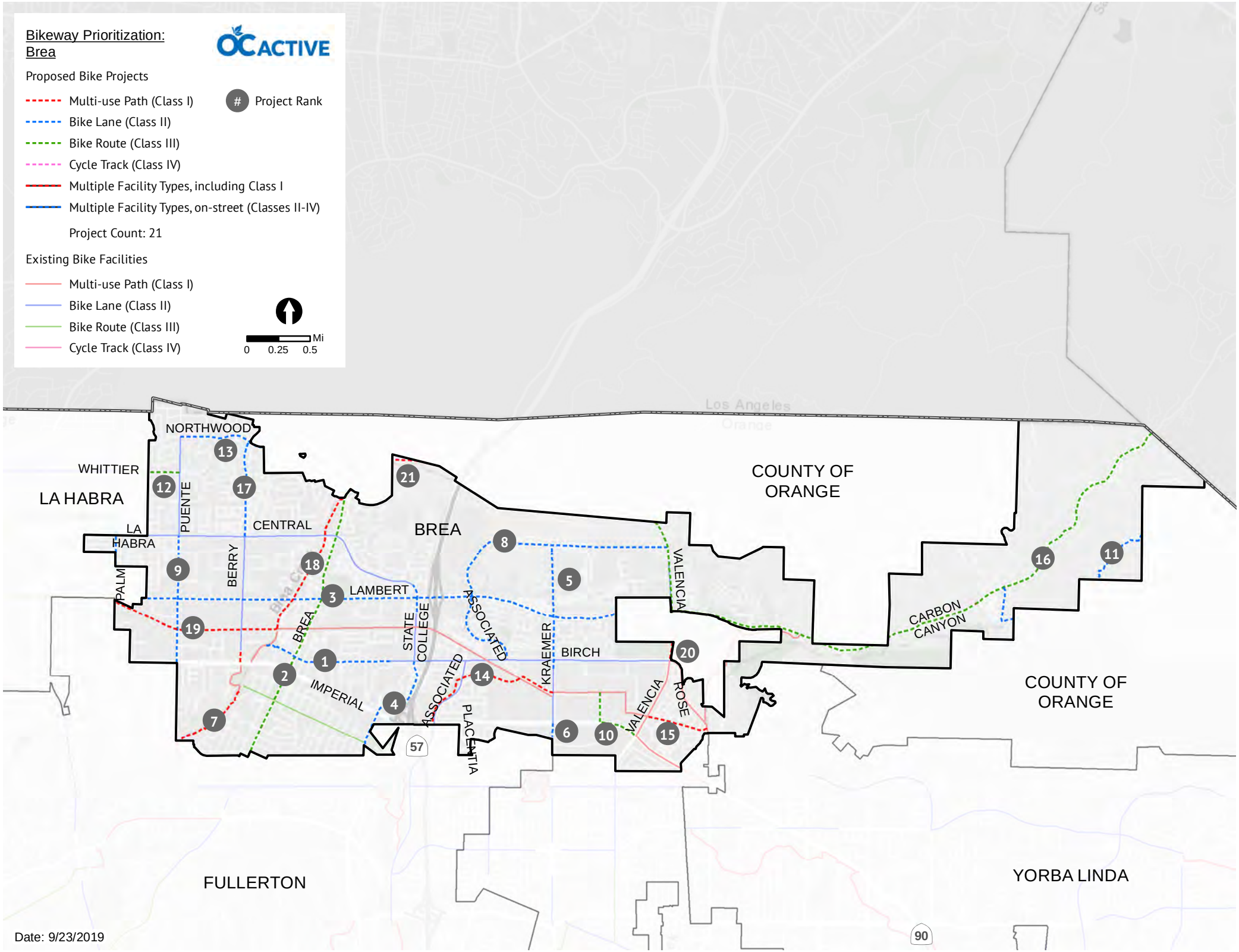
Date: 2019-08-16

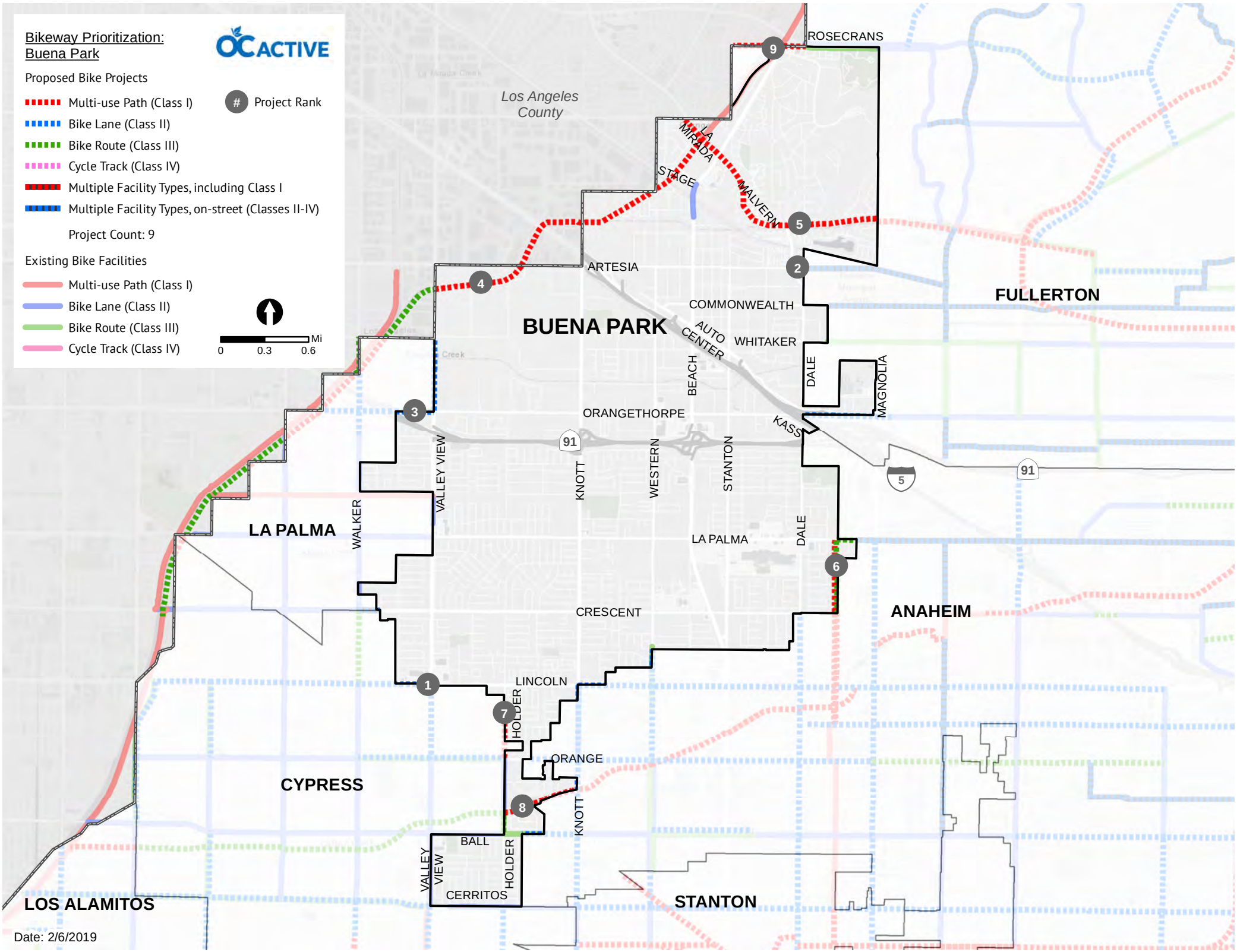

Sidewalk Gap Analysis: Yorba Linda (March 2018)
Yorba Linda Schools
Missing Sidewalk
Unincorporated County of Orange
0
0.5
1
Miles
OCACTIVE
Missing Sidewalks: 4.9 miles
BREA
BASTANCHURY
VALLEY VIEW
IMPERIAL
ROSE
LAKEVIEW
OHIO
FAIRMONT
VILLAGE CENTER
YORBA LINDA
YORBA LINDA
BUENA VISTA
RICHFIELD
KELLOGG
PLACENTIA
Unincorporated County of Orange
ESPERANZA
WEIR CANYON
LA PALMA
GYPSUM CANYON
SAN BERNARDINO COUNTY
Orange
Unincorporated County of Orange
ANAHEIM
ORANGE
Date: 2019-08-16
Note:
Missing sidewalks may be limited to one side of roadway. Sidewalk installation may not be feasible due to limited land use and other constraints.
The Sidewalk Inventory was conducted along regionally- significant roadways in Orange County through aerial image review between May 2015 and April 2016.
Unincorporated County of Orange "island" areas shown in city map to inform pedestrian focus areas and potential multi-agency partnerships. Sum length of missing sidewalks per city includes inventory in county islands. Local jurisdictional boundaries remain unchanged.

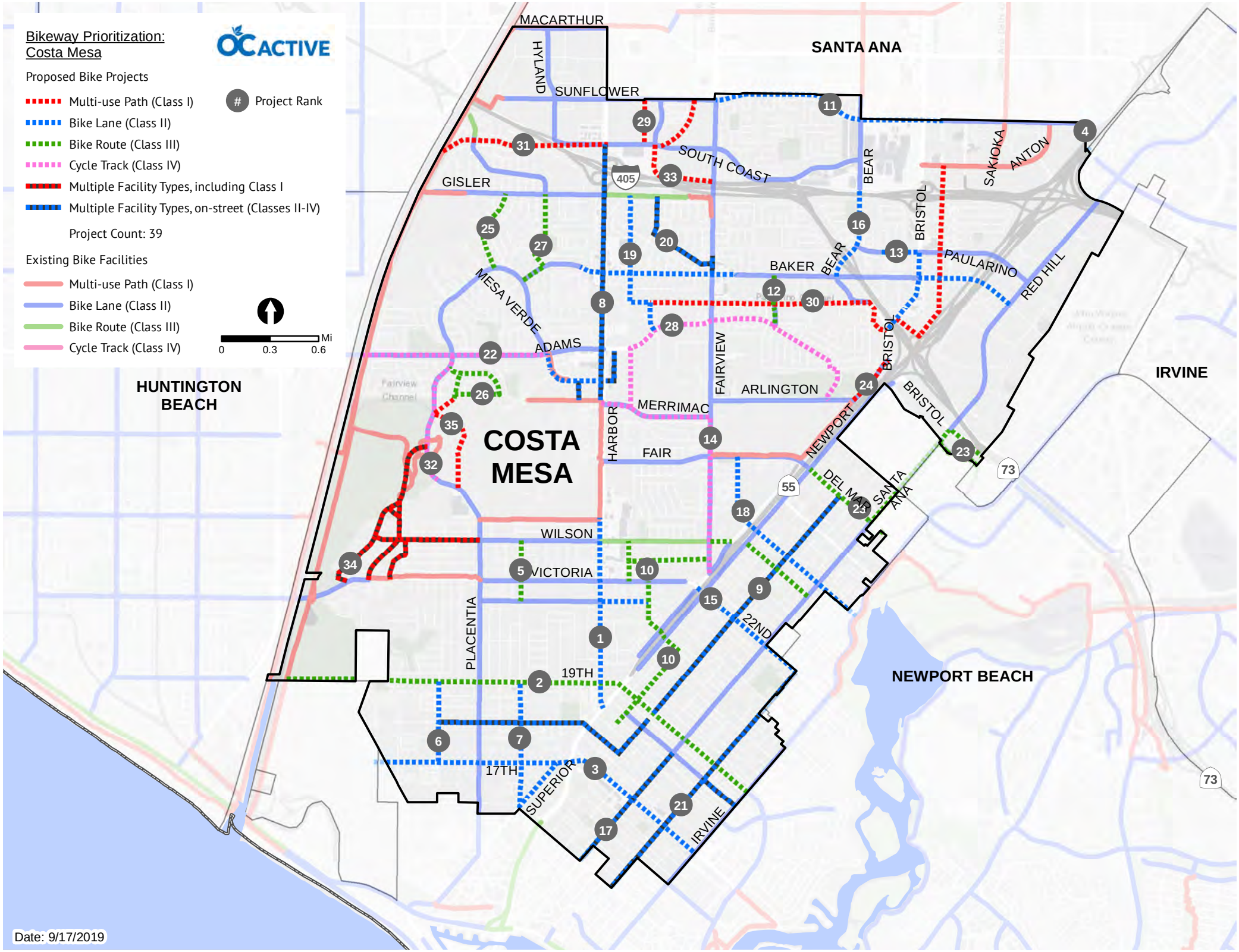
A.6 City-by-City Bikeway Prioritization Maps

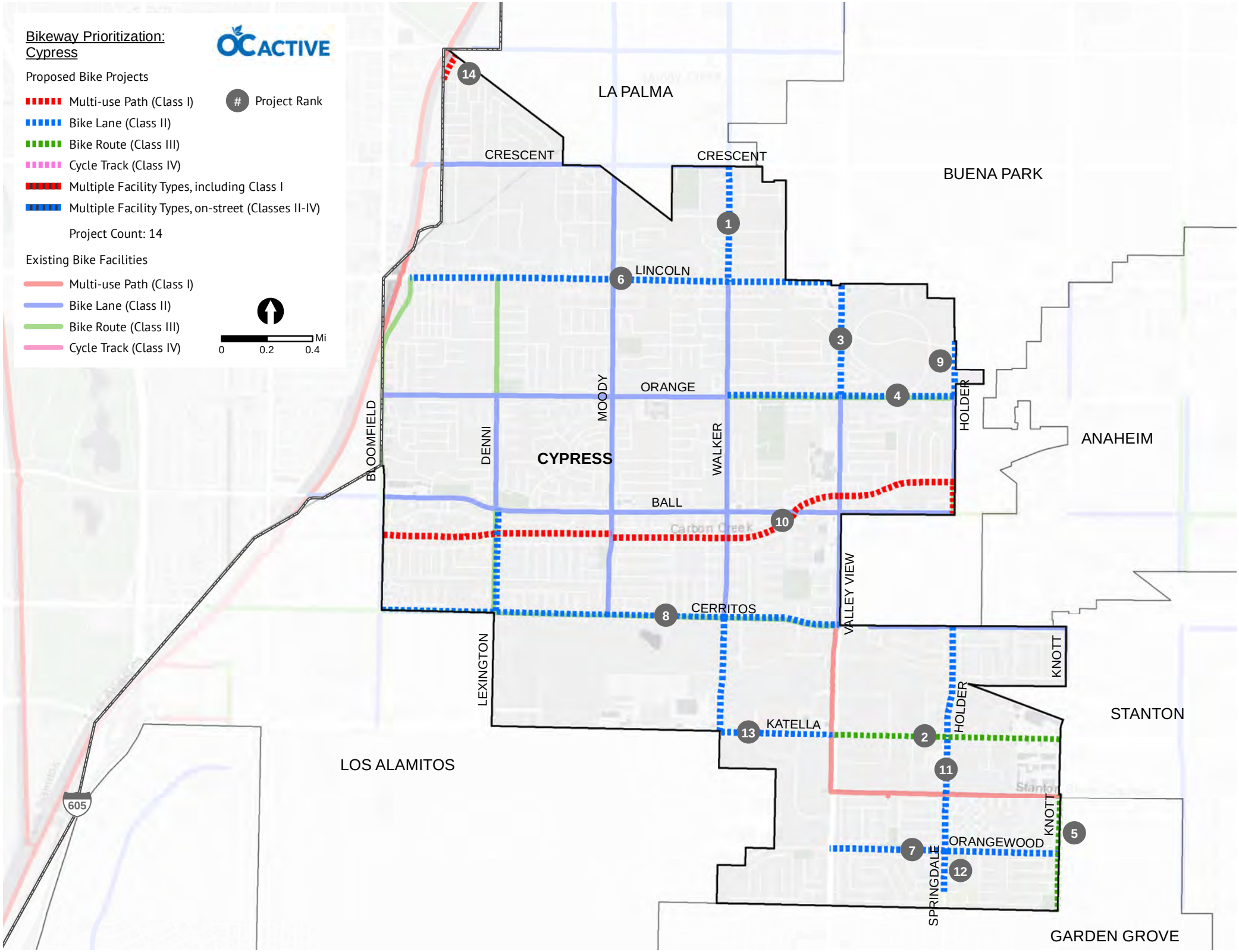

Bikeway Prioritization:
Aliso Viejo
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 1
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.25 0.5 Mi
LAGUNA WOODS
LAKE FOREST
MISSION VIEJO
5
GLENWOOD
73
ALISO VIEJO
ALISO CREEK
ALISO VIEJO
1
LAGUNA HILLS
COUNTY OF ORANGE
PACIFIC PARK
ALICIA
LA PAZ
WOOD CANYON
LAGUNA BEACH
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
Date: 9/25/2018


Bikeway Prioritization:
Anaheim
Bicycle Master Plan
Tier 1
Tier 2
Tier 3
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0 0.5 1
COUNTY OF ORANGE
BREA
San Bernardino County
YORBA LINDA
FULLERTON
PLACENTIA
BUENA PARK
ANAHEIM
VILLA PARK
ORANGE
STANTON
GARDEN GROVE
WESTMINSTER
SANTA ANA
IRVINE
LAKEVIEW
RIVERDALE
SANTIAGO
TUSTIN
ORANGETHORPE
LA PALMA
KELLOGG
IMPERIAL
SANTA ANA CANYON
WEIR CANYON
OAK CANYON
FAIRMONT
CANYON RIM
NOHL RANCH
ROYAL OAK
ANAHEIM HILLS
MEATS
SERRANO
ROMNEYA
CRESCENT
BROADWAY
LINCOLN
BALL
CERRITOS
KATELLA
ORANGEWOOD
DISNEY
GENE AUTRY
WAGNER
STATE COLLEGE
RIO VISTA
SUNKIST
DOUGLASS
TAFT
EAST
HARBOR
MANCHESTER
EUCLID
WALNUT
BROOKHURST
DALE
BEACH
WESTERN
MAGNOLIA
GILBERT
KNOTT
ACACIA
PLACENTIA
GUM
BLUE
MIRALOMA
KRAEMER
MILLER
91
90
57
5
55
22
241
261
405

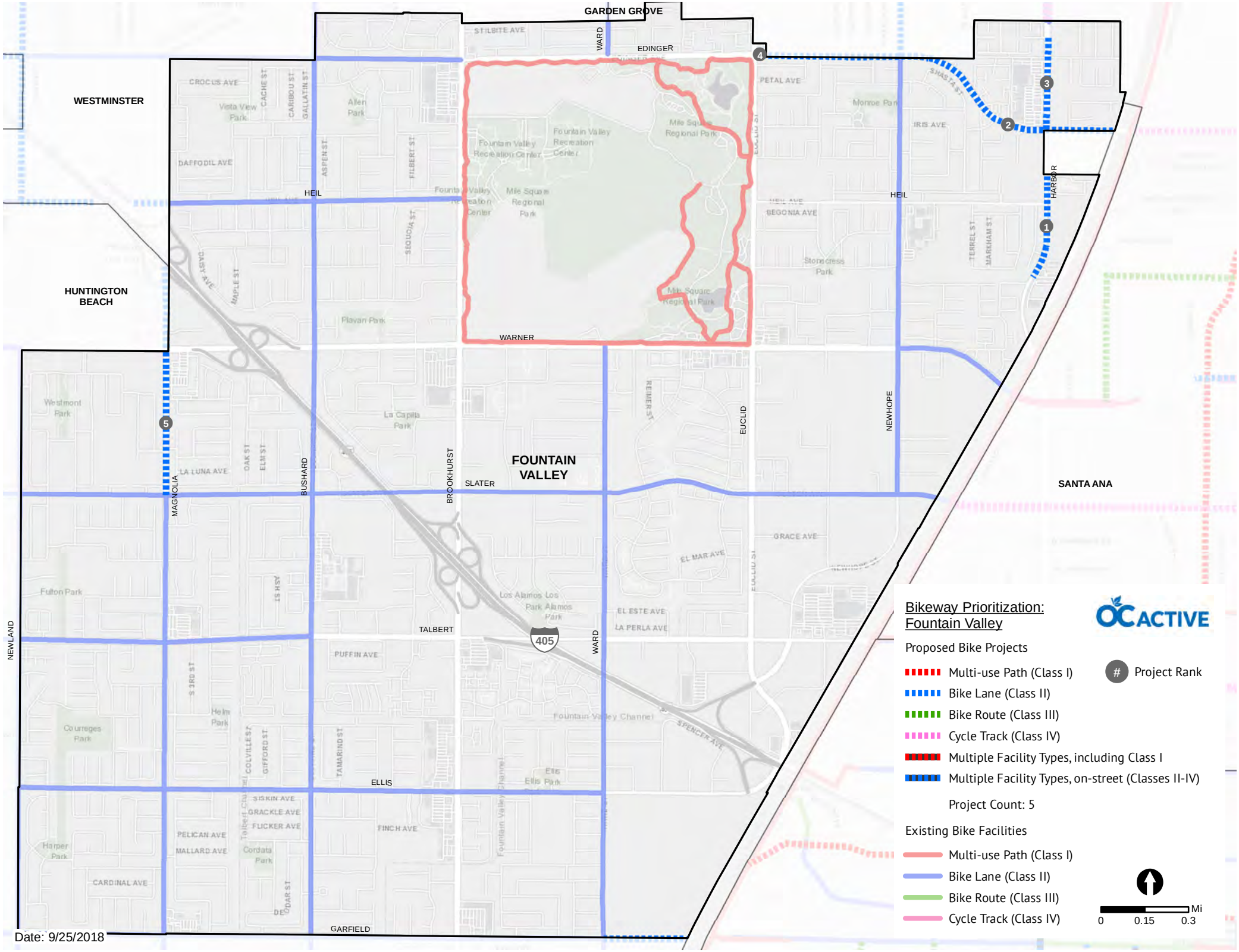

Bikeway Prioritization:
Brea
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 21
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0 0.25 0.5
NORTHWOOD
WHITTIER
LA HABRA
LA HABRA
PUENTE
CENTRAL
BREA
BERRY
PALM
LAMBERT
BREA
STATE COLLEGE
ASSOCIATED
KRAEMER
BIRCH
VALENCIA
CARBON CANYON
IMPERIAL
ASSOCIATED
PLACENTIA
VALENCIA
ROSE
COUNTY OF ORANGE
COUNTY OF ORANGE
FULLERTON
YORBA LINDA
Los Angeles
Orange
57
90
Date: 9/23/2019

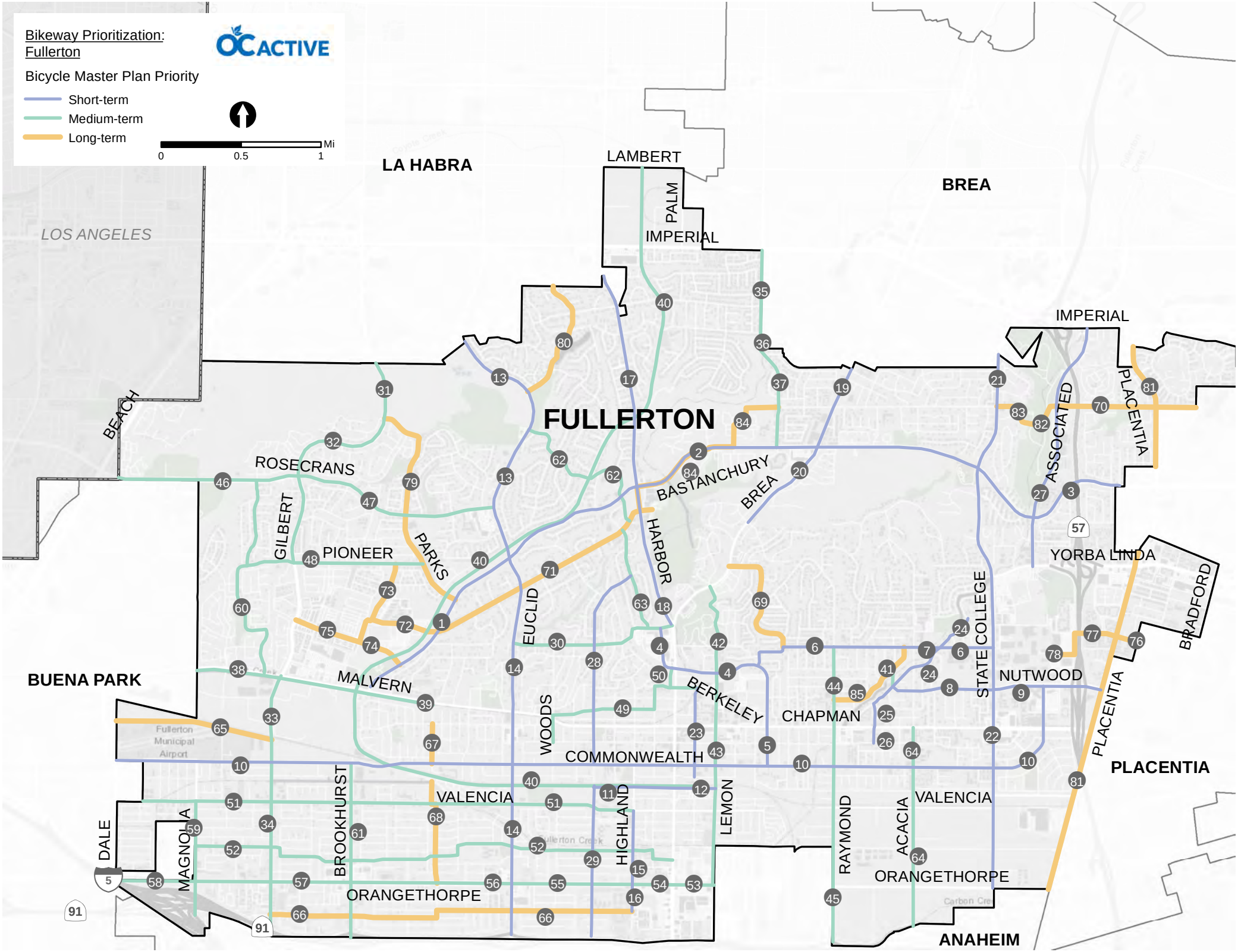

Bikeway Prioritization:
Buena Park
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 9
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.3 0.6 Mi
Date: 2/6/2019
Los Angeles County
ROSECRANS
LA MIRADA
STAGE
MALVERN
ARTESIA
COMMONWEALTH
BUENA PARK
AUTO CENTER
WHITAKER
BEACH
DALE
MAGNOLIA
FULLERTON
ORANGETHORPE
KASS
91
KNOTT
WESTERN
STANTON
VALLEY VIEW
WALKER
LA PALMA
DALE
CRESCENT
ANAHEIM
LINCOLN
HOLDER
ORANGE
CYPRESS
BALL
VALLEY VIEW
HOLDER
KNOTT
CERRITOS
LOS ALAMITOS
STANTON
1
2
3
4
5
6
7
8
9

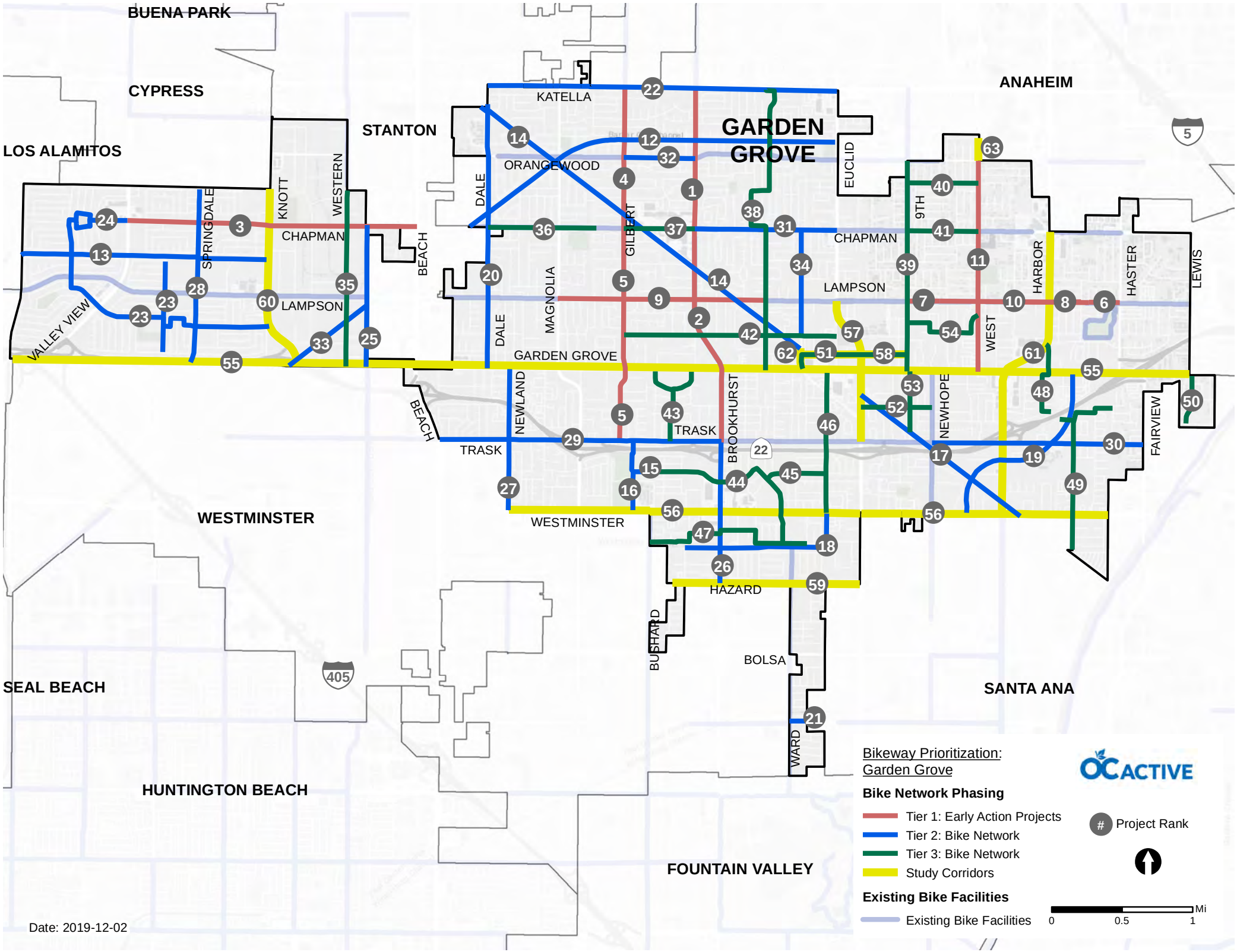

Bikeway Prioritization:
Costa Mesa
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 39
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.3 0.6 Mi
Date: 9/17/2019
COSTA MESA
SANTA ANA
IRVINE
HUNTINGTON BEACH
NEWPORT BEACH
MACARTHUR
HYLAND
SUNFLOWER
SOUTH COAST
GISLER
405
BEAR
SAKIOKA
ANTON
BRISTOL
PAULARINO
RED HILL
BAKER
MESA VERDE
ADAMS
FAIRVIEW
ARLINGTON
MERRIMAC
HARBOR
FAIR
NEWPORT
DEL MAR
SANTA ANA
WILSON
VICTORIA
PLACENTIA
19TH
17TH
SUPERIOR
IRVINE
22ND
55
73

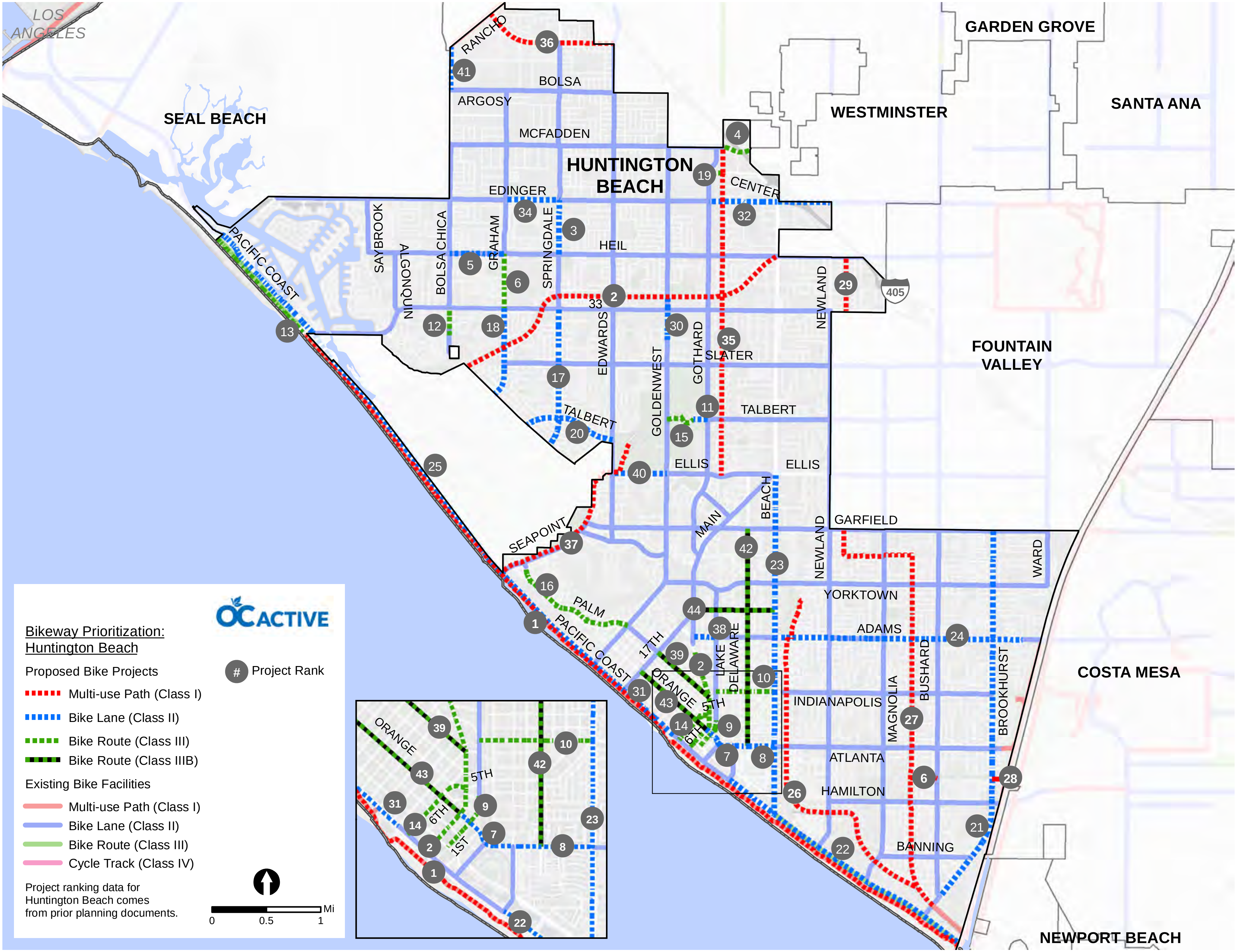

Bikeway Prioritization:
Cypress
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 14
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.2 0.4 Mi
LA PALMA
BUENA PARK
ANAHEIM
CYPRESS
STANTON
LOS ALAMITOS
GARDEN GROVE
CRESCENT
CRESCENT
LINCOLN
ORANGE
BALL
CERRITOS
KATELLA
ORANGEWOOD
BLOOMFIELD
DENNI
MOODY
WALKER
HOLDER
VALLEY VIEW
LEXINGTON
KNOTT
KNOTT
HOLDER
SPRINGDALE
605
14
1
6
3
9
4
10
8
13
2
11
5
7
12

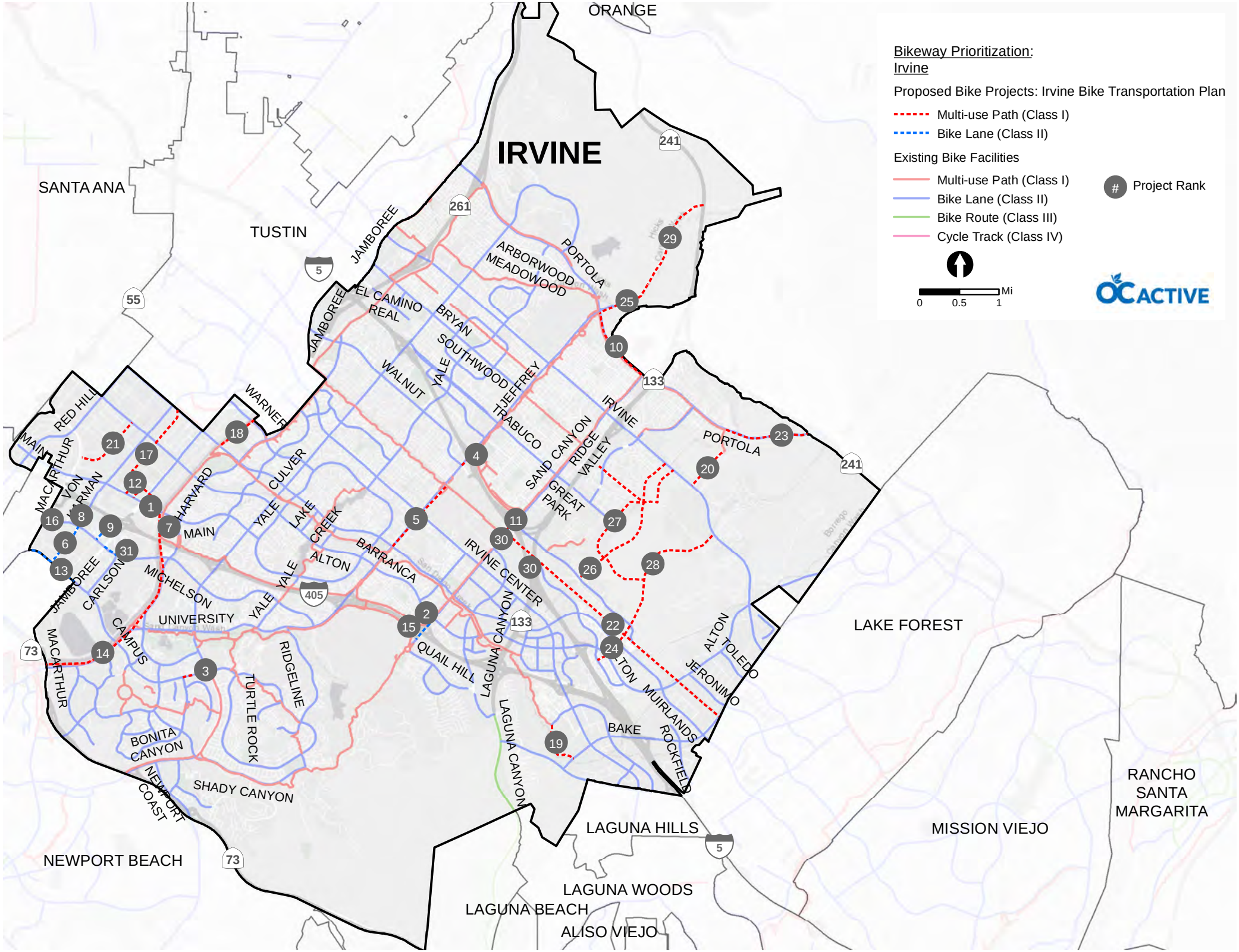

Bikeway Prioritization:
Dana Point
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Rank
Project Count: 16
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.25 0.5 Mi
LAGUNA BEACH
PACIFIC ISLAND
LAGUNA NIGUEL
CROWN VALLEY
CAMINO DEL AVION
NIGUEL
STONEHILL
DEL OBISPO
SELVA
STREET OF THE GOLDEN LANTERN
PACIFIC COAST
DANA POINT
DOHENY PARK
DEL PRADO
DANA POINT HARBOR
SAN CLEMENTE
CAMINO DE ESTRELLA
COAST
CAMINO CAPISTRANO
EL CAMINO REAL
5
1
7
11
8
12
13
14
6
10
15
9
1
5
3
2
4
16
Date: 2/6/2019

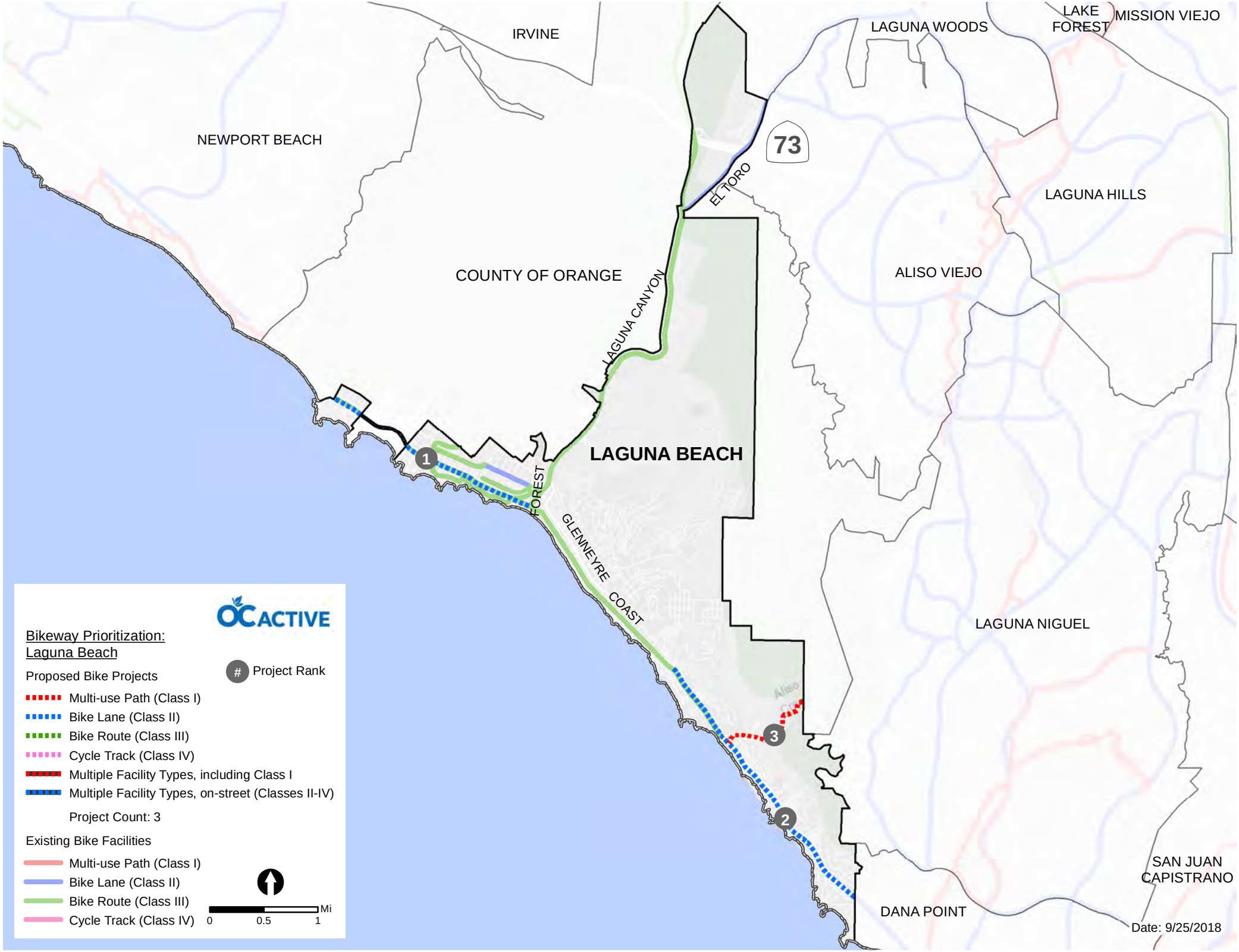

GARDEN GROVE
WESTMINSTER
HUNTINGTON BEACH
FOUNTAIN VALLEY
SANTA ANA
STILBITE AVE
WARD
EDINGER
CROCUS AVE
DAFFODIL AVE
HEIL
PETAL AVE
IRIS AVE
BEGONIA AVE
HARBOR
WARNER
SLATER
TALBERT
ELLIS
GARFIELD
MAGNOLIA
BUSHARD
BROOKHURST
EUCLID
NEWHOPE
NEWLAND
LA LUNA AVE
GRACE AVE
EL MAR AVE
EL ESTE AVE
LA PERLA AVE
PUFFIN AVE
SISKIN AVE
GRACKLE AVE
FLICKER AVE
FINCH AVE
PELICAN AVE
MALLARD AVE
CARDINAL AVE
SPENCER AVE
405
Vista View Park
Allen Park
Fountain Valley Recreation Center
Mile Square Regional Park
Monroe Park
Stonecress Park
Plavan Park
Westmont Park
La Capilla Park
Fulton Park
Los Alamos Park
Helm Park
Courreges Park
Harper Park
Cordata Park
Ellis Park
Fountain Valley Channel
Bikeway Prioritization:
Fountain Valley
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 5
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0
0.15
0.3
Mi
Date: 9/25/2018

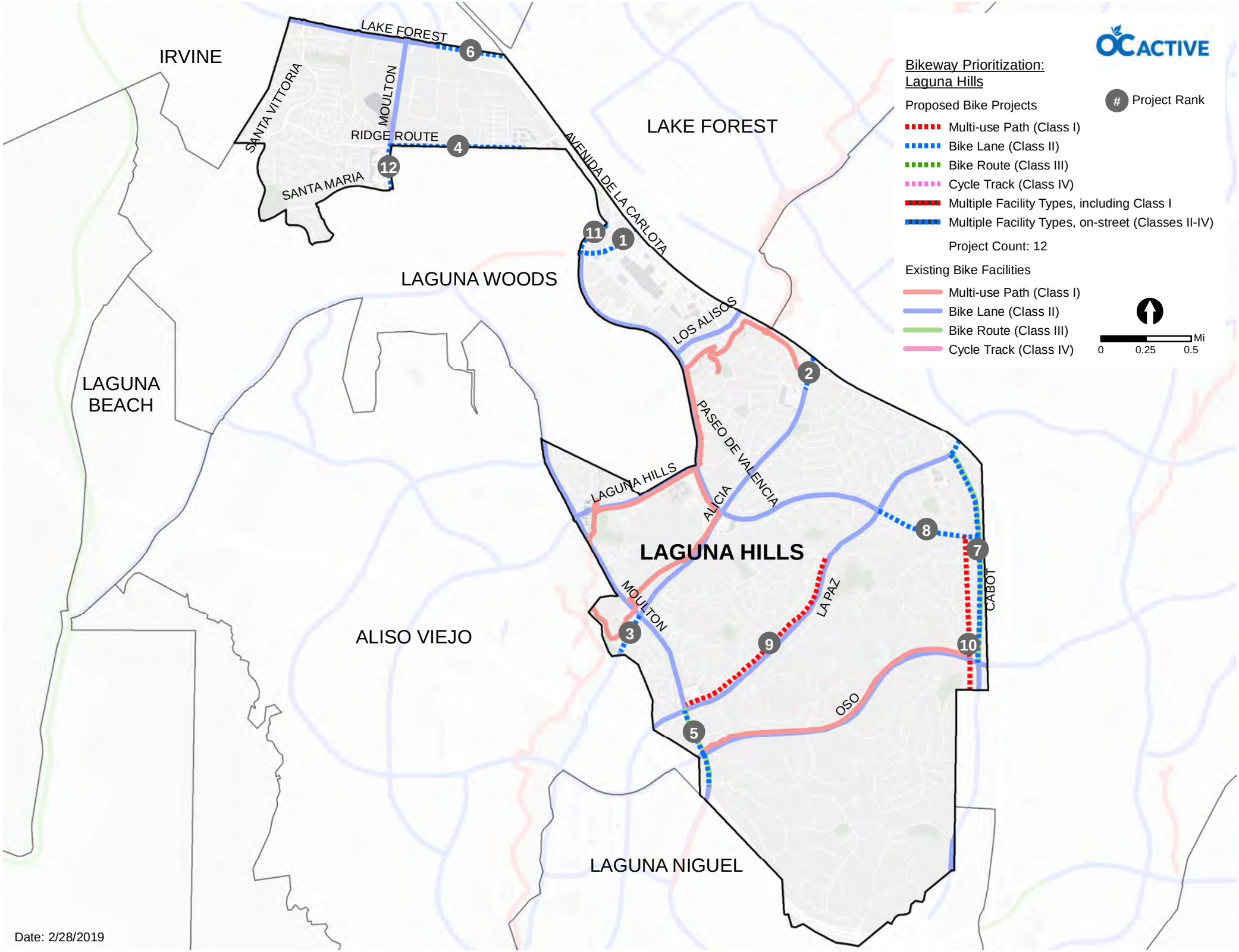

Bikeway Prioritization:
Fullerton
OCACTIVE
Bicycle Master Plan Priority
Short-term
Medium-term
Long-term
0
0.5
1
Mi
LA HABRA
LAMBERT
BREA
LOS ANGELES
PALM
IMPERIAL
FULLERTON
BEACH
ROSECRANS
GILBERT
PIONEER
PARKS
HARBOR
BASTANCHURY
BREA
ASSOCIATED
PLACENTIA
YORBA LINDA
BRADFORD
EUCLID
STATE COLLEGE
NUTWOOD
BUENA PARK
MALVERN
WOODS
BERKELEY
CHAPMAN
COMMONWEALTH
PLACENTIA
Fullerton Municipal Airport
VALENCIA
BROOKHURST
HIGHLAND
LEMON
RAYMOND
ACACIA
VALENCIA
DALE
MAGNOLIA
ORANGETHORPE
ORANGETHORPE
ANAHEIM
5
91
91
57

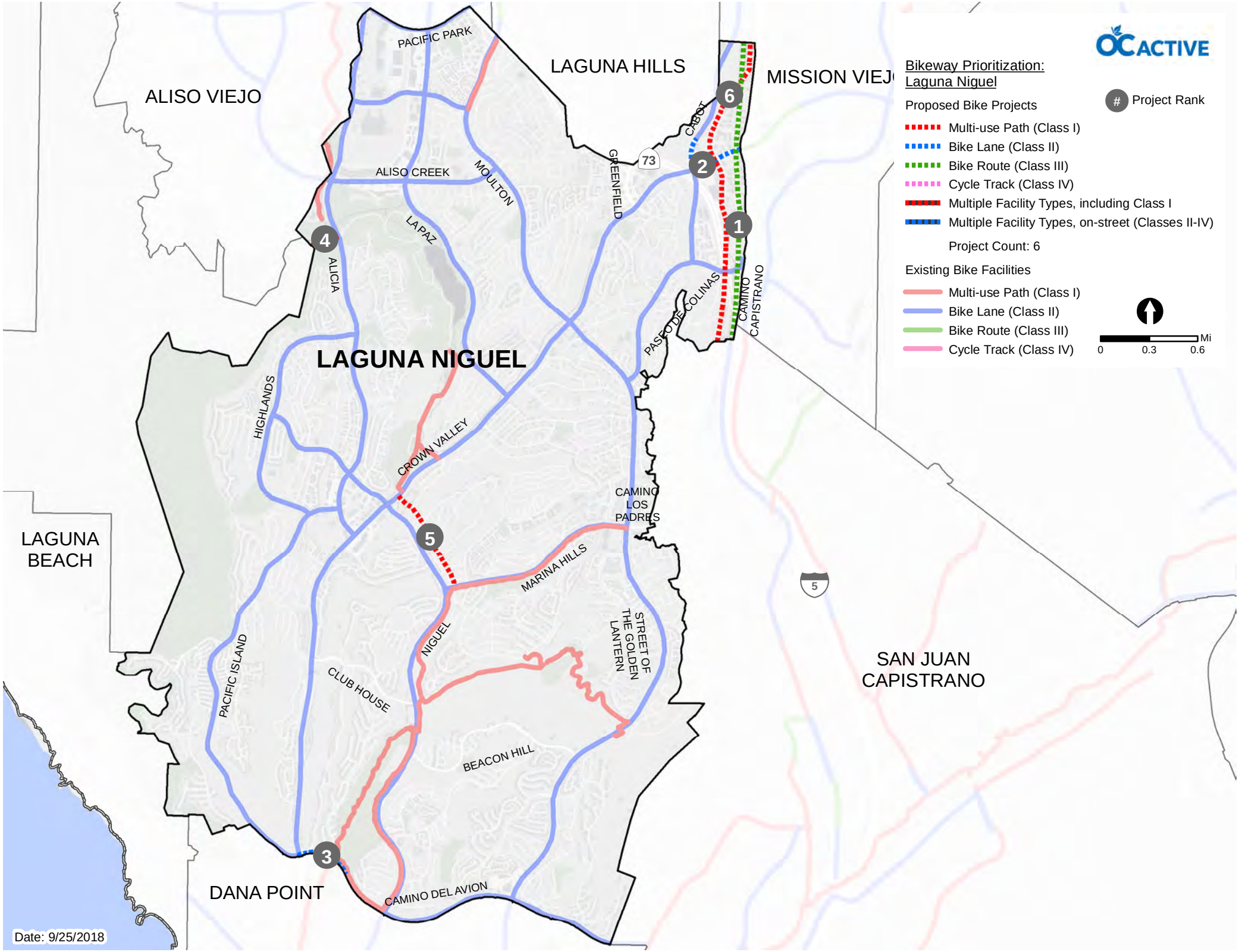

BUENA PARK
CYPRESS
LOS ALAMITOS
STANTON
ANAHEIM
GARDEN GROVE
KATELLA
ORANGEWOOD
CHAPMAN
LAMPSON
GARDEN GROVE
TRASK
WESTMINSTER
HAZARD
BOLSA
SEAL BEACH
HUNTINGTON BEACH
FOUNTAIN VALLEY
SANTA ANA
VALLEY VIEW
SPRINGDALE
KNOTT
WESTERN
BEACH
DALE
MAGNOLIA
GILBERT
EUCLID
9TH
HARBOR
HASTER
LEWIS
WEST
NEWLAND
BROOKHURST
NEWHOPE
FAIRVIEW
BUSHARD
WARD
5
22
405
Bikeway Prioritization:
Garden Grove
OCACTIVE
Bike Network Phasing
Tier 1: Early Action Projects
Tier 2: Bike Network
Tier 3: Bike Network
Study Corridors
Existing Bike Facilities
Existing Bike Facilities
Project Rank
Mi
0
0.5
1
Date: 2019-12-02

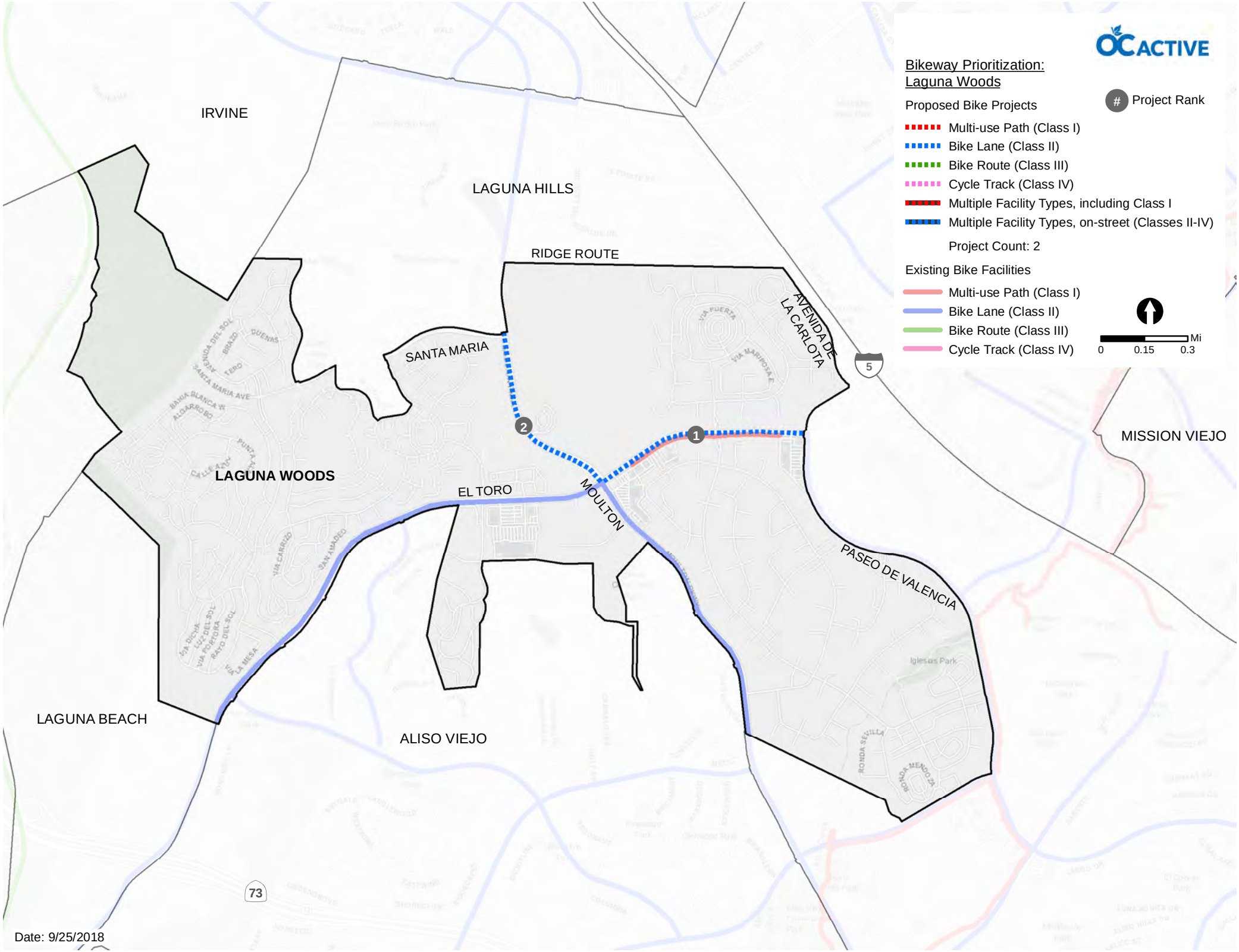

Bikeway Prioritization:
Huntington Beach
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Bike Route (Class IIIB)
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Project ranking data for
Huntington Beach comes
from prior planning documents.
OC ACTIVE
Project Rank
0 0.5 1 Mi
LOS ANGELES
SEAL BEACH
HUNTINGTON BEACH
GARDEN GROVE
WESTMINSTER
SANTA ANA
FOUNTAIN VALLEY
COSTA MESA
NEWPORT BEACH
405
RANCHO
BOLSA
ARGOSY
MCFADDEN
EDINGER
HEIL
CENTER
SLATER
TALBERT
ELLIS
GARFIELD
YORKTOWN
ADAMS
INDIANAPOLIS
ATLANTA
HAMILTON
BANNING
PACIFIC COAST
SAYBROOK
ALGONQUIN
BOLSA CHICA
GRAHAM
SPRINGDALE
EDWARDS
GOLDENWEST
GOTHARD
NEWLAND
BEACH
MAIN
SEAPOINT
PALM
17TH
ORANGE
5TH
6TH
1ST
LAKE
DELAWARE
MAGNOLIA
BUSHARD
BROOKHURST
WARD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

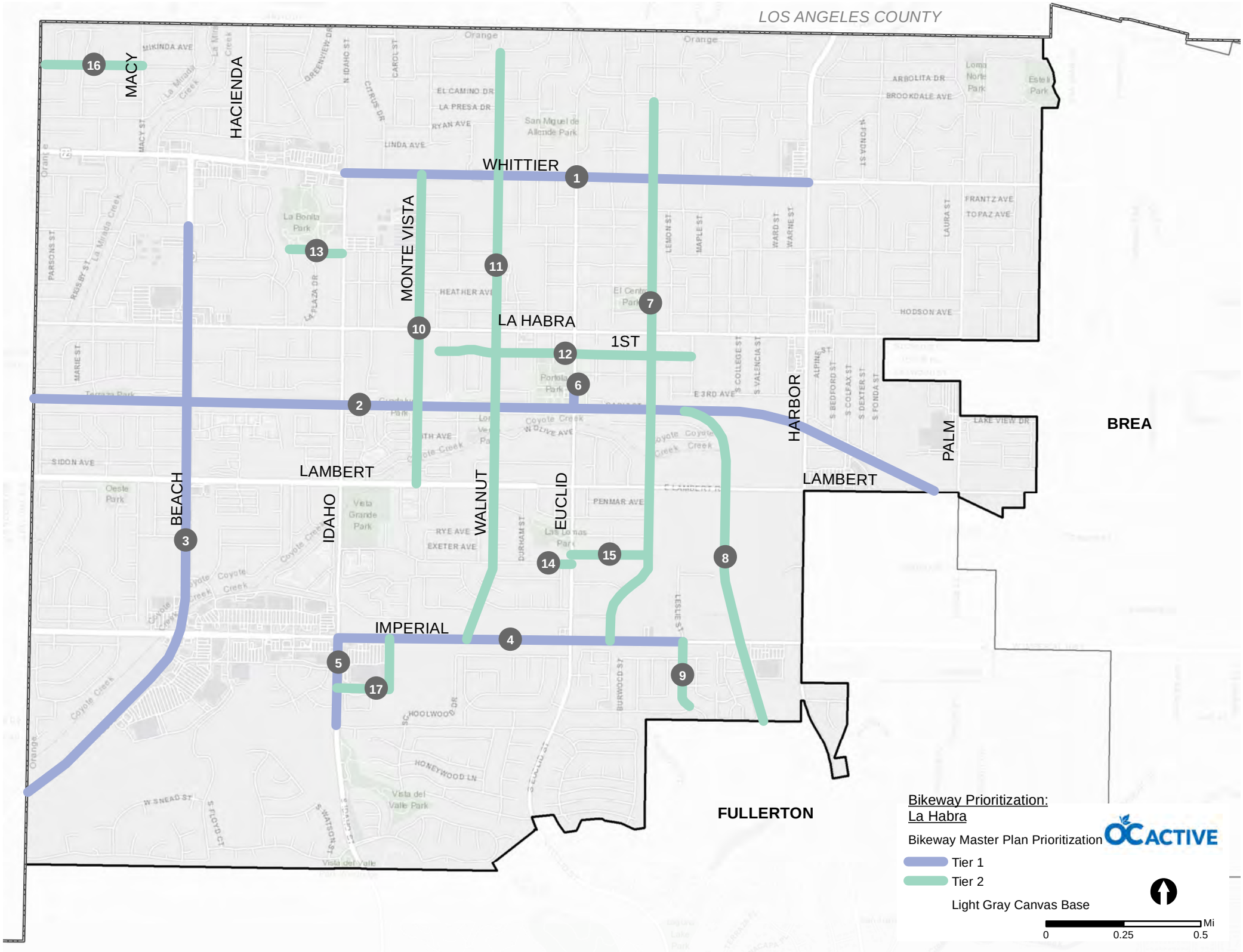

Bikeway Prioritization:
Irvine
Proposed Bike Projects: Irvine Bike Transportation Plan
Multi-use Path (Class I)
Bike Lane (Class II)
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Project Rank
Mi
0 0.5 1
OCACTIVE
IRVINE
ORANGE
SANTA ANA
TUSTIN
LAKE FOREST
RANCHO SANTA MARGARITA
MISSION VIEJO
LAGUNA HILLS
LAGUNA WOODS
LAGUNA BEACH
ALISO VIEJO
NEWPORT BEACH
241
261
5
55
133
405
73
JAMBOREE
EL CAMINO REAL
ARBORWOOD
MEADOWOOD
PORTOLA
BRYAN
SOUTHWOOD
JEFFREY
YALE
WALNUT
TRABUCO
IRVINE
SAND CANYON
RIDGE VALLEY
GREAT PARK
WARNER
RED HILL
MACARTHUR
MAIN
VON KARMAN
HARVARD
CULVER
LAKE
CREEK
ALTON
BARRANCA
IRVINE CENTER
LAGUNA CANYON
CARLSON
MICHELSON
UNIVERSITY
CAMPUS
RIDGELINE
TURTLE ROCK
BONITA CANYON
NEWPORT COAST
SHADY CANYON
QUAIL HILL
TOLEDO
JERONIMO
MUIRLANDS
ROCKFIELD
BAKE

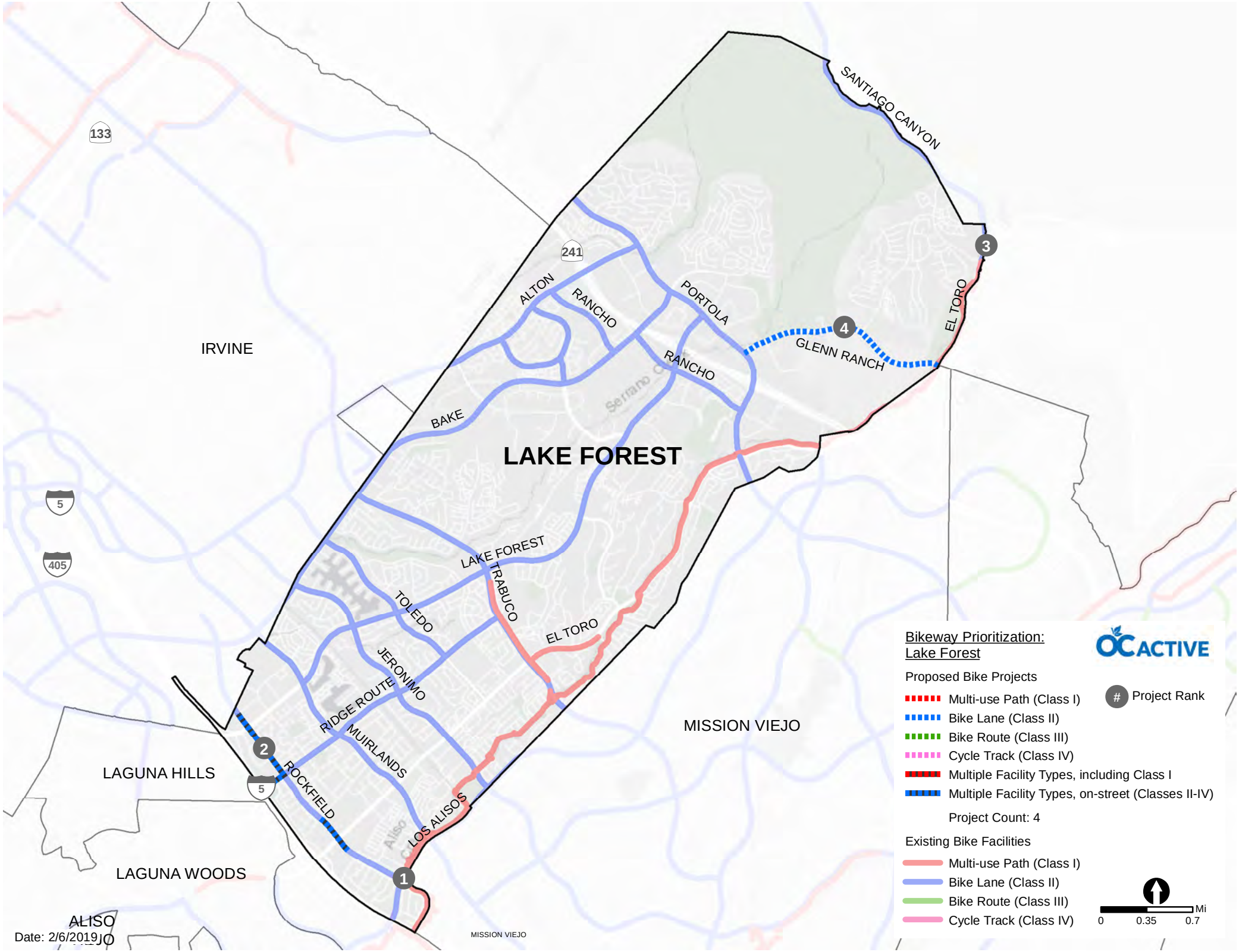

IRVINE
LAGUNA WOODS
LAKE FOREST
MISSION VIEJO
NEWPORT BEACH
73
EL TORO
LAGUNA HILLS
COUNTY OF ORANGE
LAGUNA CANYON
ALISO VIEJO
LAGUNA BEACH
FOREST
GLENNEYRE
COAST
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
DANA POINT
OCACTIVE
Bikeway Prioritization:
Laguna Beach
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 3
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0
0.5
1
Mi
Date: 9/25/2018

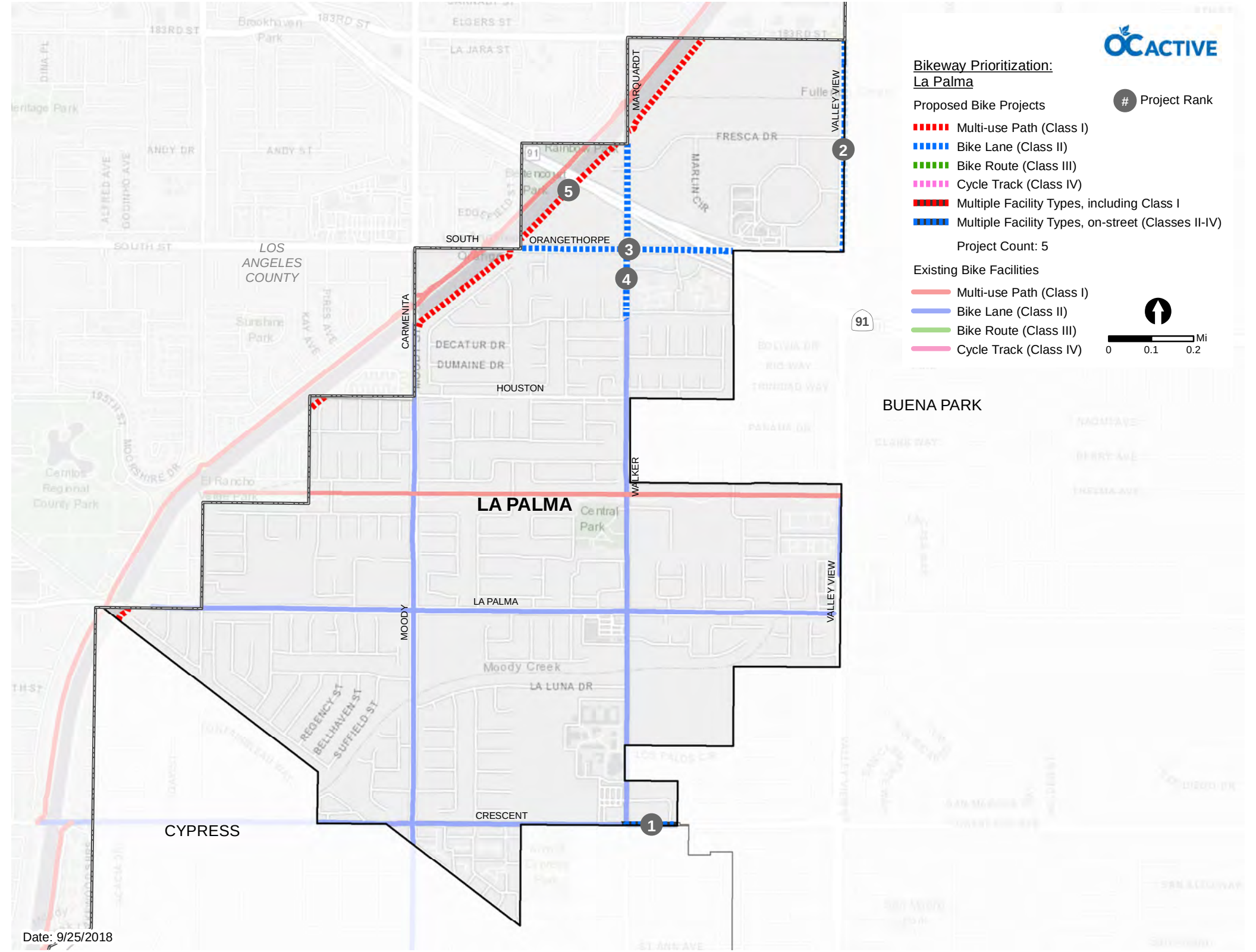

OCACTIVE
Bikeway Prioritization:
Laguna Hills
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 12
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.25 0.5 Mi
IRVINE
LAKE FOREST
LAGUNA WOODS
LAGUNA BEACH
ALISO VIEJO
LAGUNA NIGUEL
LAGUNA HILLS
LAKE FOREST
SANTA VITTORIA
MOULTON
RIDGE ROUTE
SANTA MARIA
AVENIDA DE LA CARLOTA
LOS ALISOS
PASEO DE VALENCIA
LAGUNA HILLS
ALICIA
MOULTON
LA PAZ
CABOT
OSO
6
4
12
11
1
2
8
7
3
9
10
5
Date: 2/28/2019


OCACTIVE
Bikeway Prioritization:
Laguna Niguel
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 6
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0 0.3 0.6
LAGUNA NIGUEL
ALISO VIEJO
LAGUNA HILLS
MISSION VIEJ
LAGUNA BEACH
DANA POINT
SAN JUAN CAPISTRANO
PACIFIC PARK
ALISO CREEK
MOULTON
LA PAZ
ALICIA
GREENFIELD
CABOT
CAMINO CAPISTRANO
PASEO DE COLINAS
HIGHLANDS
CROWN VALLEY
CAMINO LOS PADRES
MARINA HILLS
NIGUEL
STREET OF THE GOLDEN LANTERN
PACIFIC ISLAND
CLUB HOUSE
BEACON HILL
CAMINO DEL AVION
73
5
1
2
3
4
5
6
Date: 9/25/2018

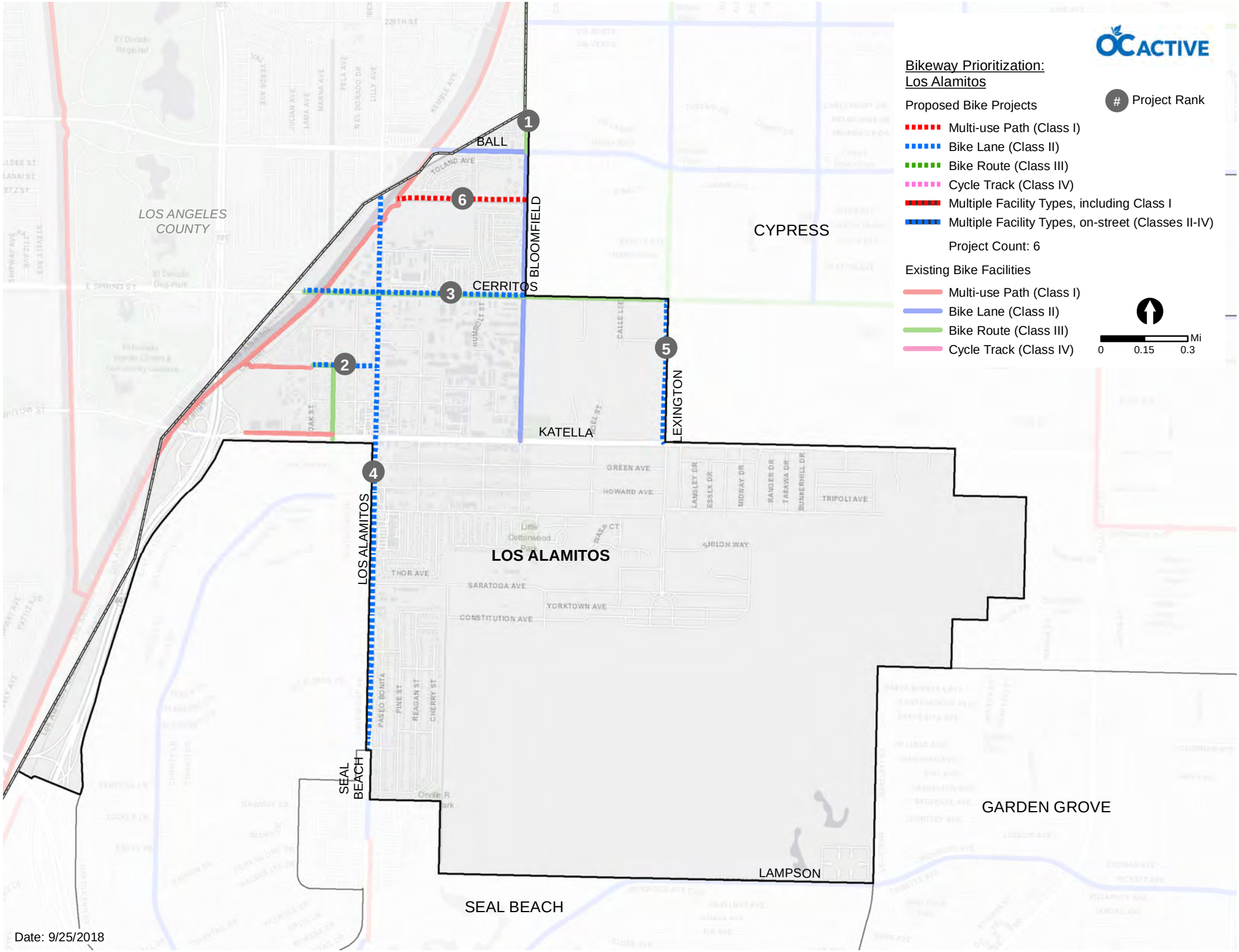

OCACTIVE
Bikeway Prioritization:
Laguna Woods
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 2
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.15 0.3 Mi
IRVINE
LAGUNA HILLS
RIDGE ROUTE
SANTA MARIA
AVENIDA DE LA CARLOTA
MISSION VIEJO
LAGUNA WOODS
EL TORO
MOULTON
PASEO DE VALENCIA
LAGUNA BEACH
ALISO VIEJO
Iglesias Park
1
2
5
73
Date: 9/25/2018

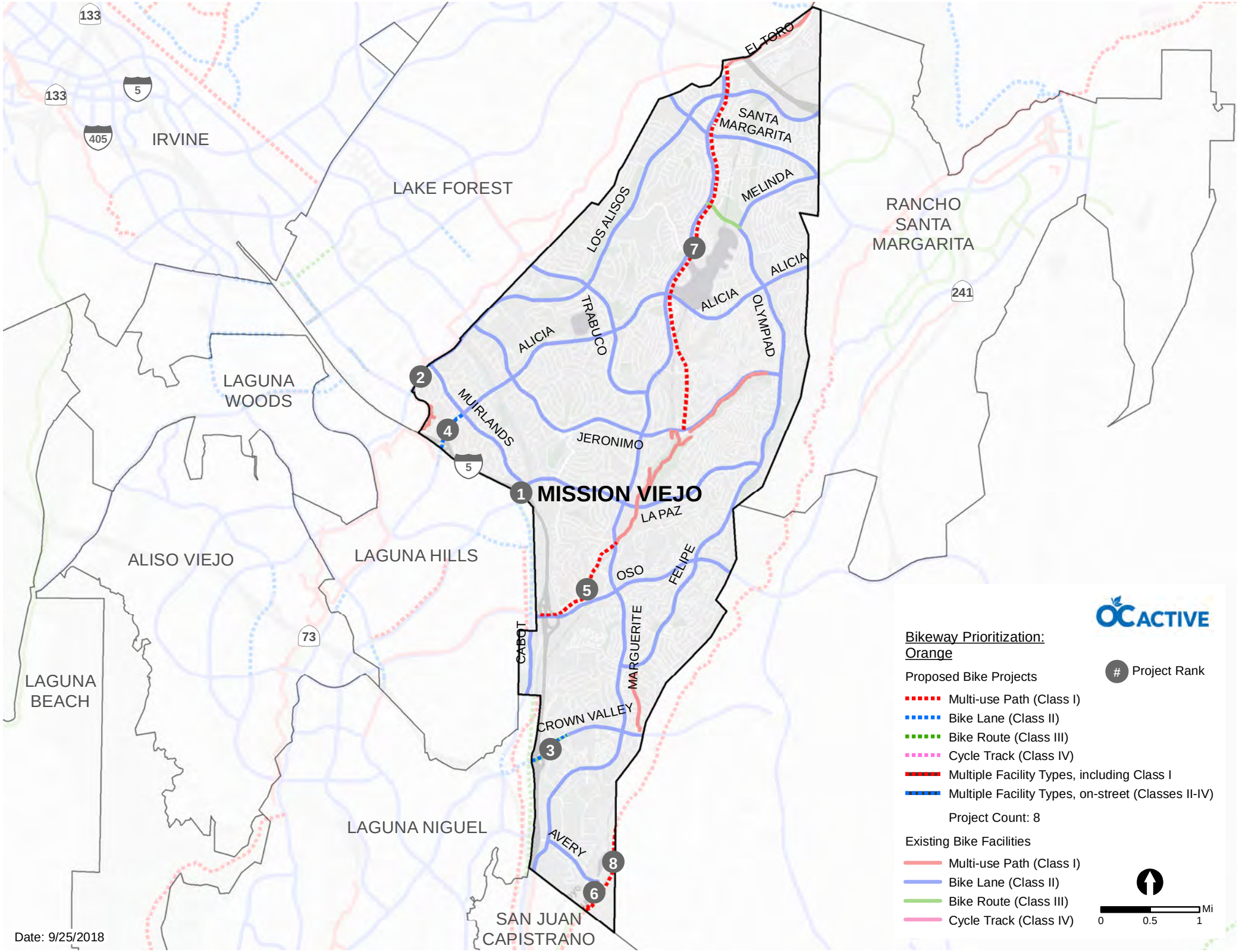

LOS ANGELES COUNTY
MACY
HACIENDA
WHITTIER
MONTE VISTA
LA HABRA
1ST
HARBOR
PALM
BEACH
LAMBERT
IDAHO
WALNUT
EUCLID
IMPERIAL
BREA
FULLERTON
16
1
13
11
7
10
12
6
2
3
4
5
17
14
15
8
9
Bikeway Prioritization:
La Habra
Bikeway Master Plan Prioritization
OCACTIVE
Tier 1
Tier 2
Light Gray Canvas Base
0
0.25
0.5
Mi

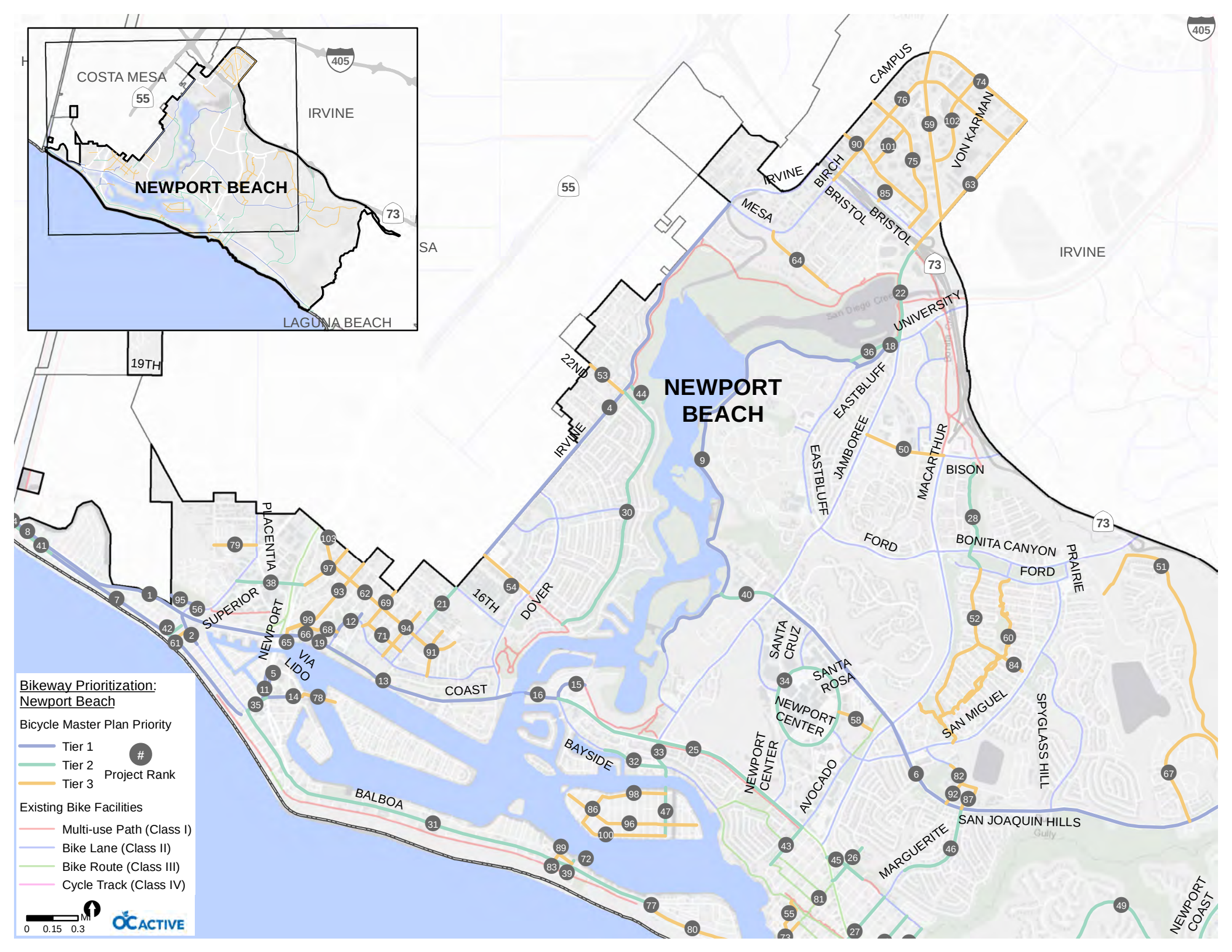

LAKE FOREST
IRVINE
MISSION VIEJO
LAGUNA HILLS
LAGUNA WOODS
ALISO
SANTIAGO CANYON
EL TORO
PORTOLA
RANCHO
ALTON
GLENN RANCH
BAKE
LAKE FOREST
TRABUCO
TOLEDO
JERONIMO
RIDGE ROUTE
MUIRLANDS
ROCKFIELD
LOS ALISOS
133
241
5
405
1
2
3
4
Bikeway Prioritization:
Lake Forest
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Rank
Project Count: 4
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.35 0.7 Mi
Date: 2/6/2019 JO

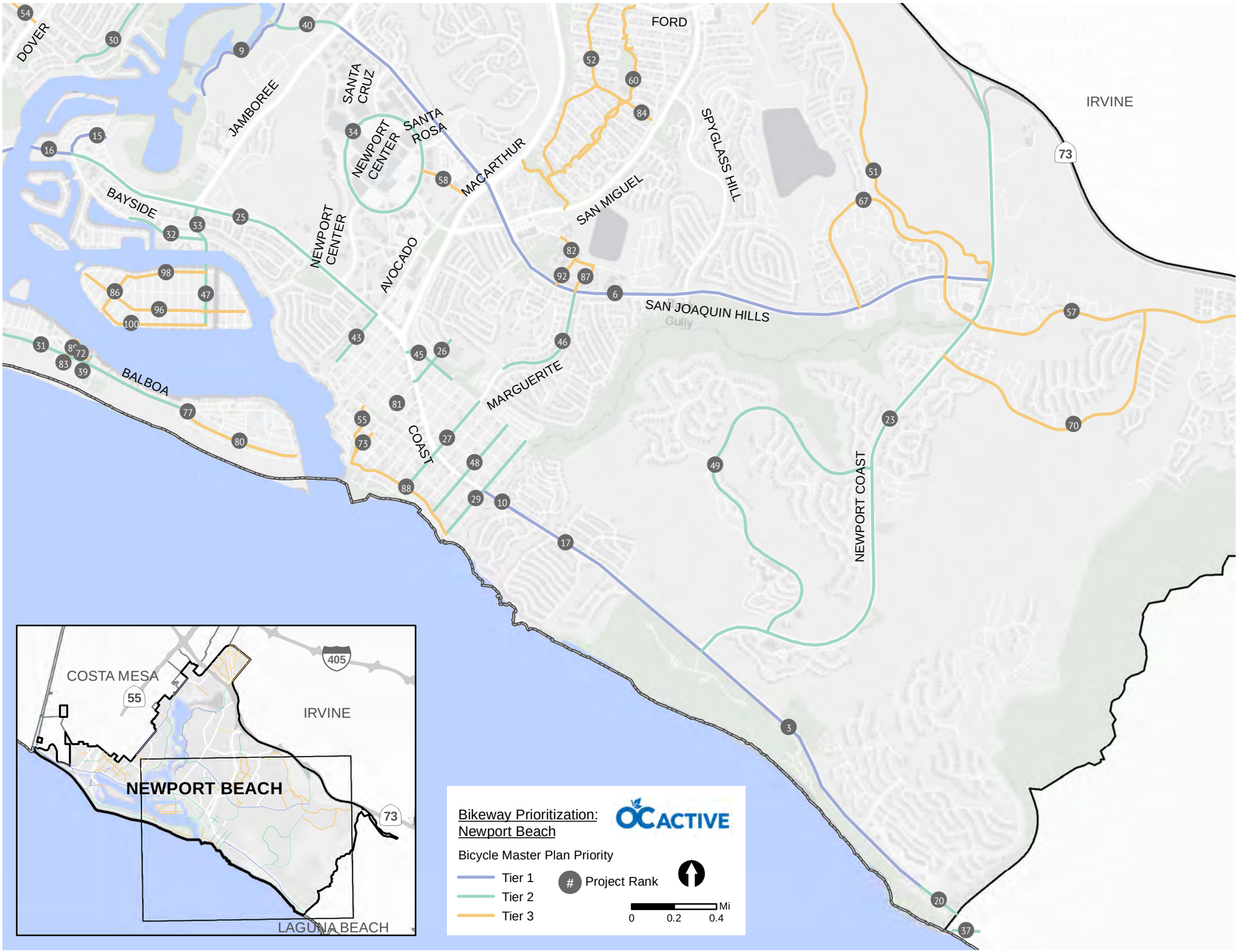


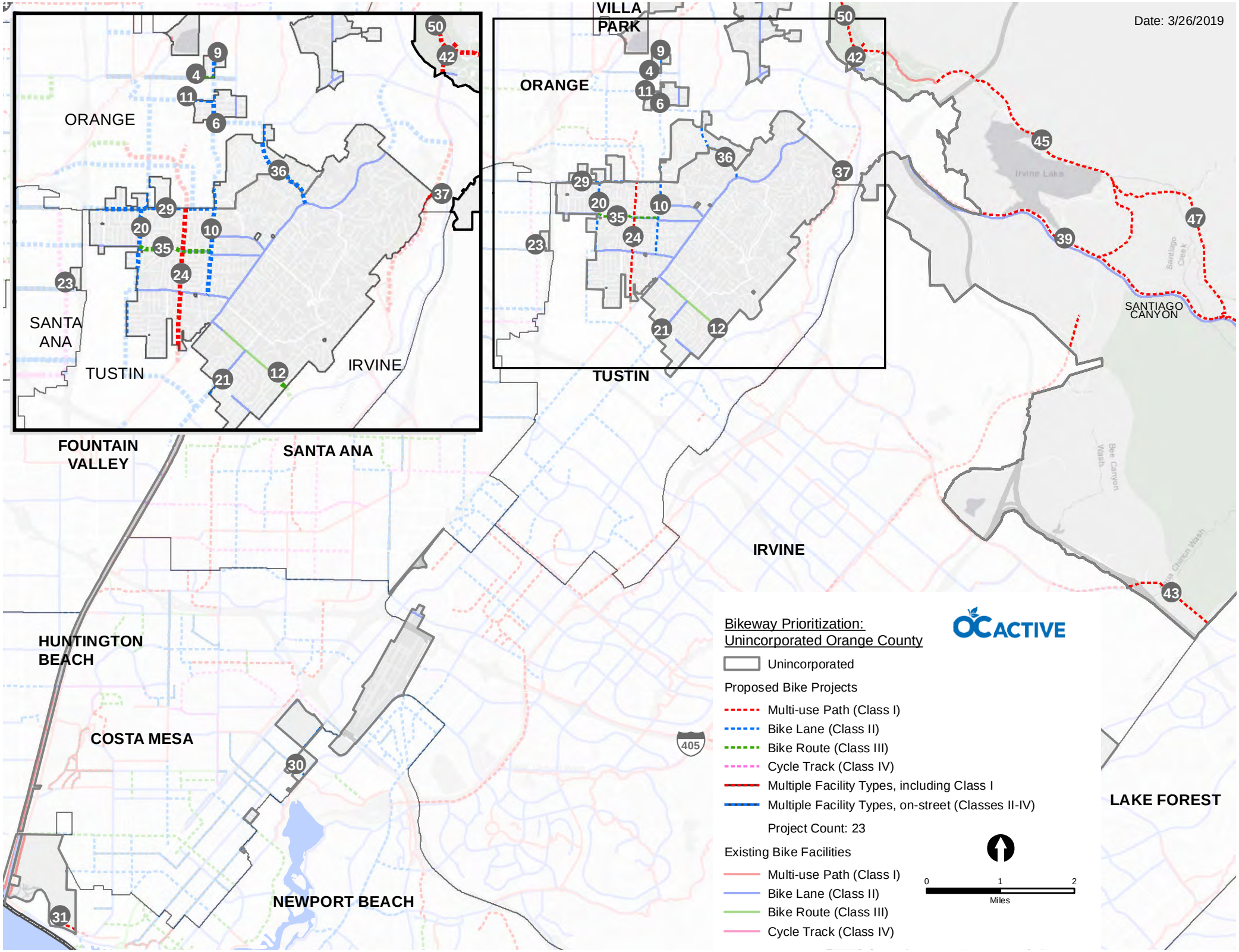
Date: 9/25/2018

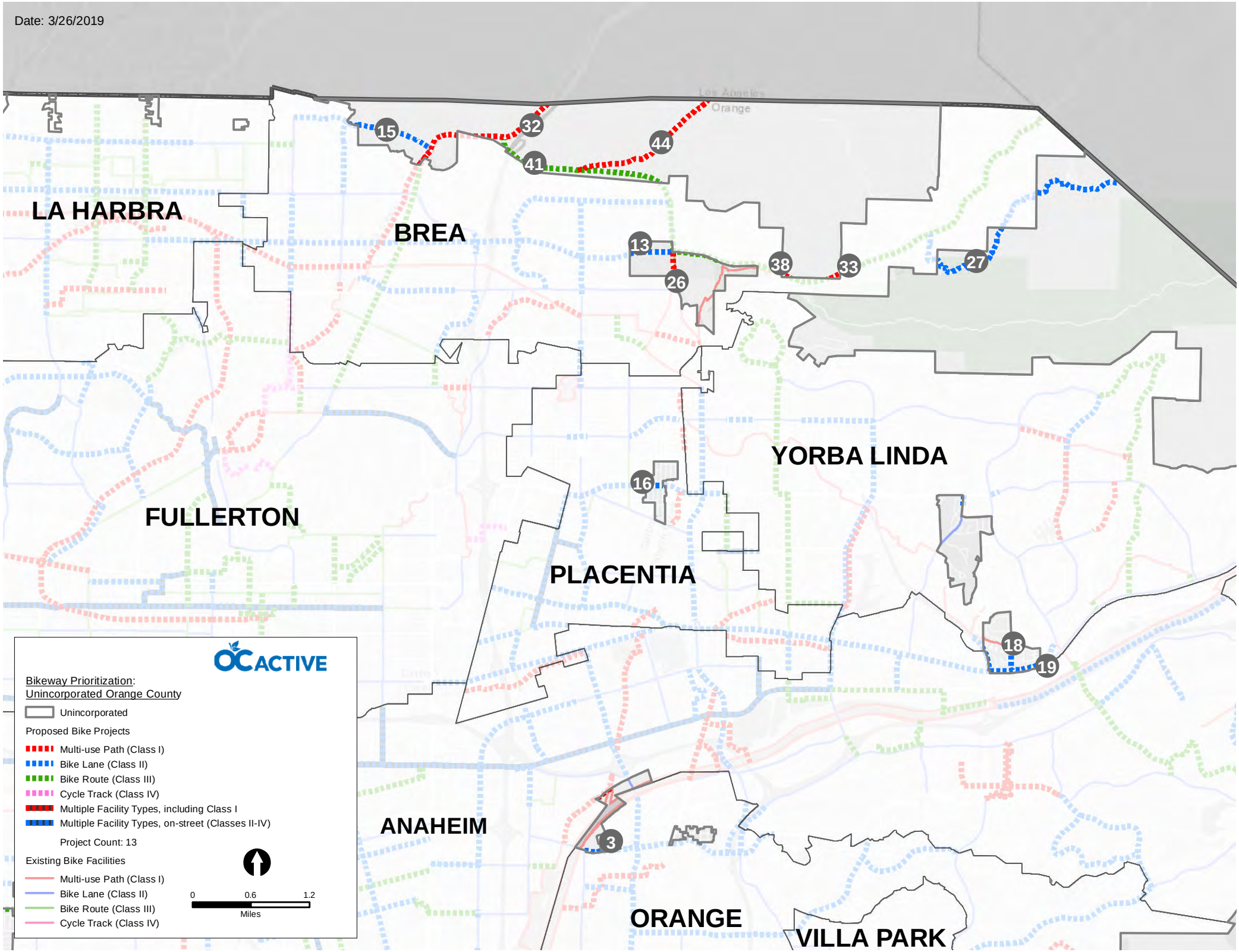

OCACTIVE
Bikeway Prioritization:
Los Alamitos
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 6
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.15
0.3
1
2
3
4
5
6
BALL
BLOOMFIELD
CERRITOS
KATELLA
LEXINGTON
LOS ALAMITOS
SEAL BEACH
LOS ANGELES COUNTY
CYPRESS
GARDEN GROVE
LAMPSON
SEAL BEACH
Date: 9/25/2018

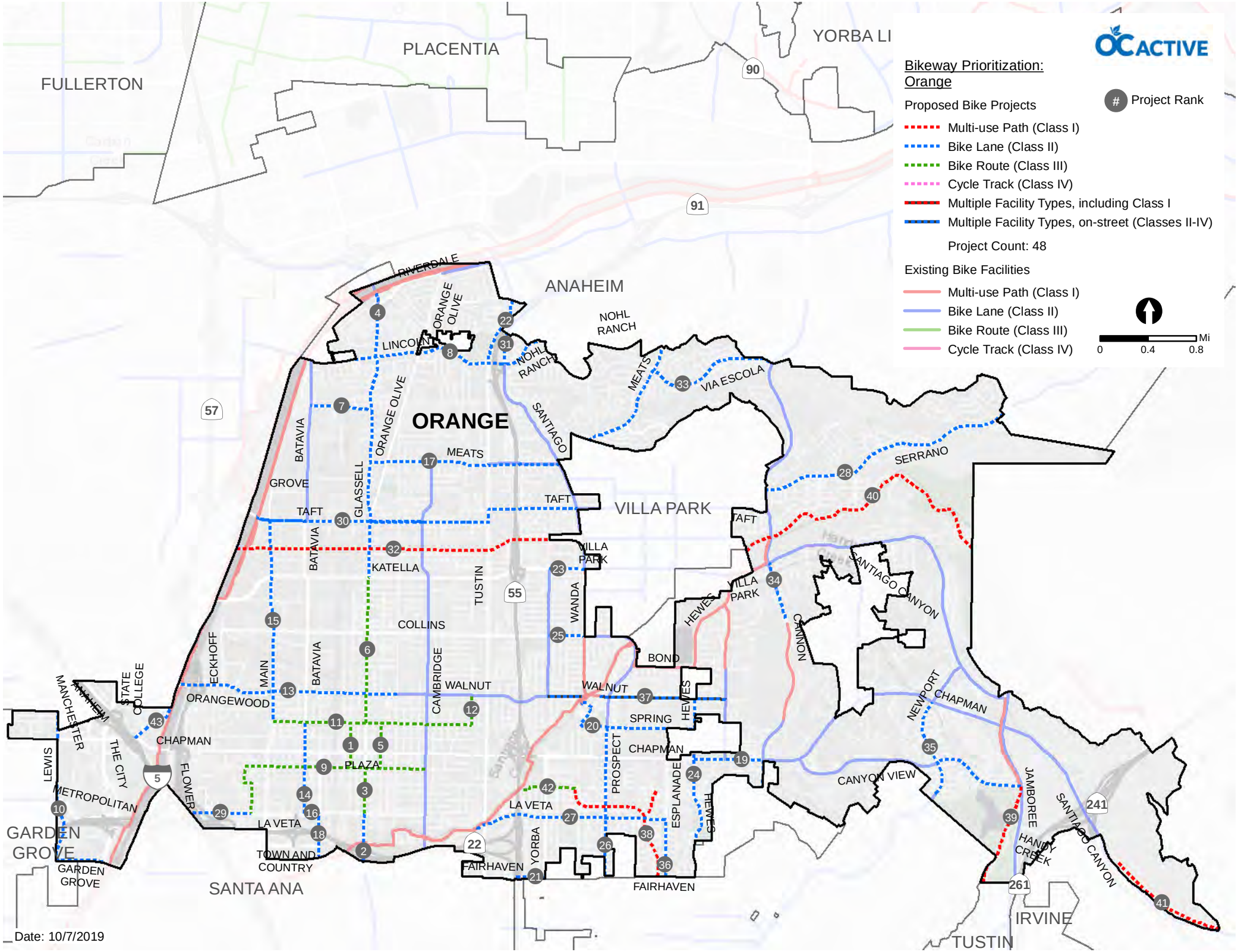

IRVINE
LAKE FOREST
RANCHO SANTA MARGARITA
LAGUNA WOODS
ALISO VIEJO
LAGUNA HILLS
LAGUNA BEACH
LAGUNA NIGUEL
SAN JUAN CAPISTRANO
MISSION VIEJO
EL TORO
SANTA MARGARITA
MELINDA
LOS ALISOS
ALICIA
TRABUCO
OLYMPIAD
MUIRLANDS
JERONIMO
LA PAZ
OSO
FELIPE
MARGUERITE
CABOT
CROWN VALLEY
AVERY
133
5
405
241
73
1
2
3
4
5
6
7
8
Bikeway Prioritization: Orange
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 8
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0
0.5
1
Mi
Date: 9/25/2018

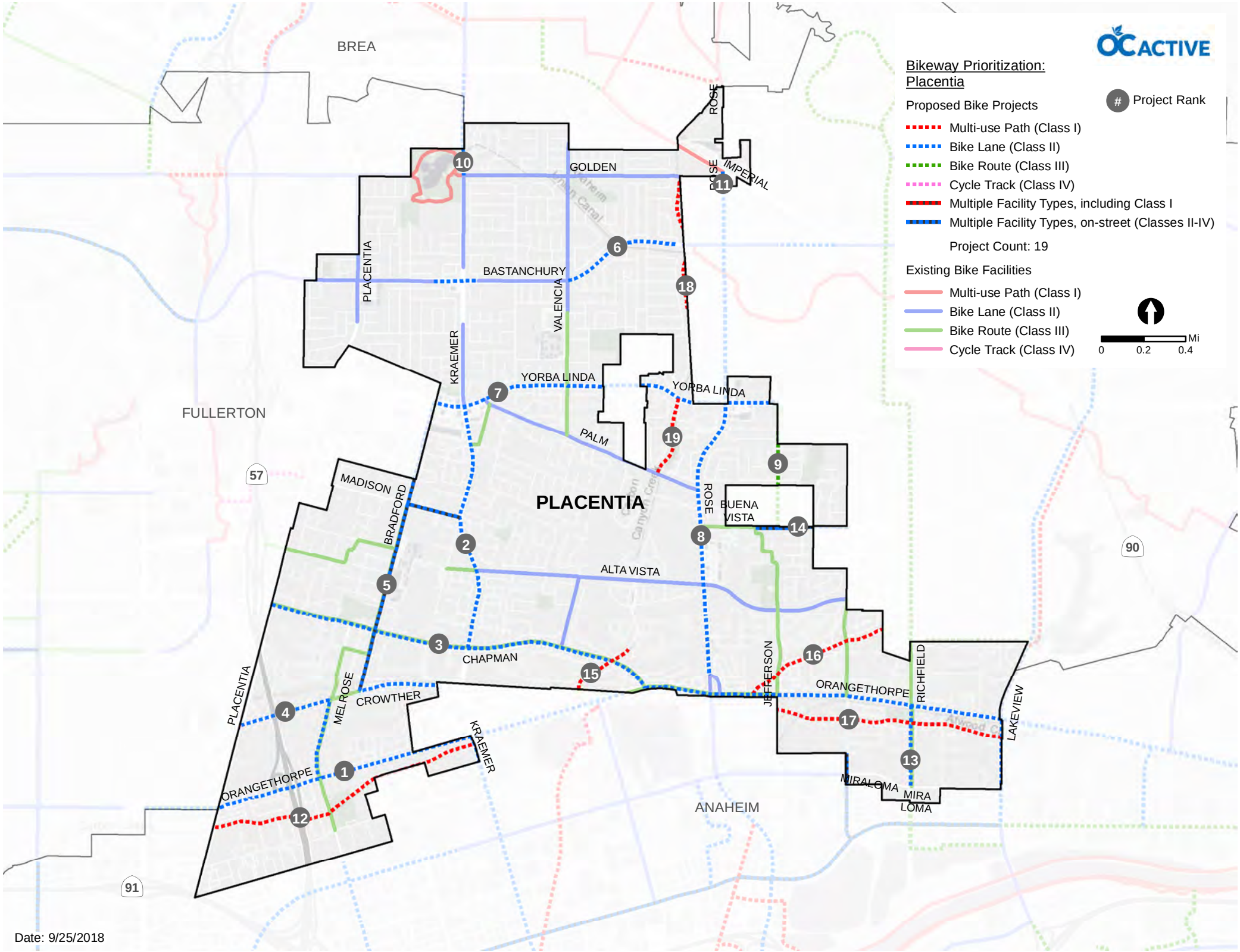

COSTA MESA
IRVINE
NEWPORT BEACH
LAGUNA BEACH
405
55
73
NEWPORT BEACH
IRVINE
MESA
CAMPUS
VON KARMAN
BIRCH
BRISTOL
UNIVERSITY
EASTBLUFF
JAMBOREE
MACARTHUR
BISON
FORD
BONITA CANYON
PRAIRIE
19TH
22ND
IRVINE
PLACENTIA
SUPERIOR
NEWPORT
VIA LIDO
16TH
DOVER
COAST
BAYSIDE
BALBOA
SANTA CRUZ
SANTA ROSA
NEWPORT CENTER
AVOCADO
SAN MIGUEL
SPYGLASS HILL
SAN JOAQUIN HILLS
MARGUERITE
NEWPORT COAST
Bikeway Prioritization:
Newport Beach
Bicycle Master Plan Priority
Tier 1
Tier 2
Tier 3
#
Project Rank
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.15 0.3
MI
OCACTIVE

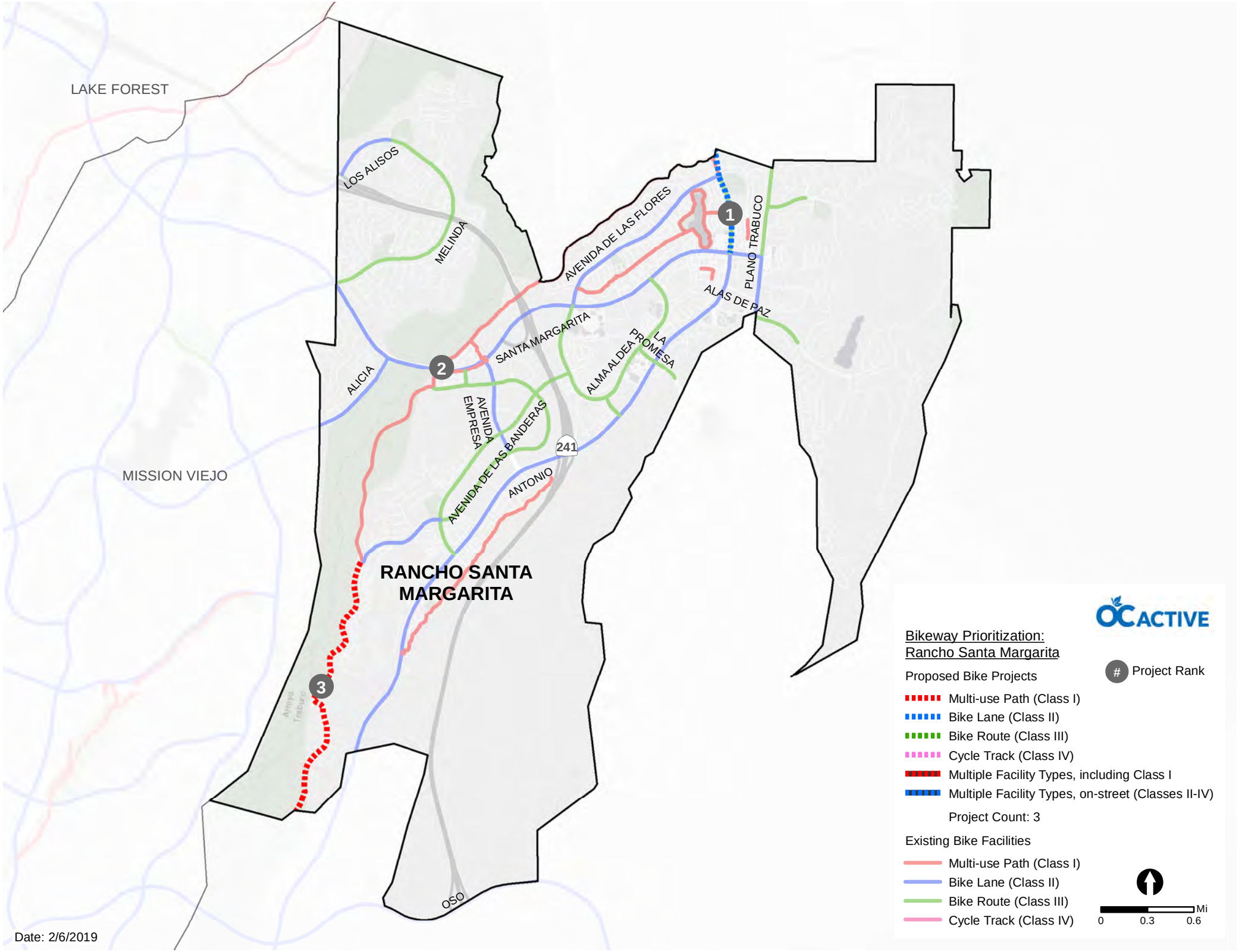

DOVER
JAMBOREE
SANTA CRUZ
NEWPORT CENTER
SANTA ROSA
MACARTHUR
FORD
IRVINE
SPYGLASS HILL
SAN MIGUEL
BAYSIDE
NEWPORT CENTER
AVOCADO
SAN JOAQUIN HILLS
Gully
BALBOA
MARGUERITE
COAST
NEWPORT COAST
COSTA MESA
IRVINE
NEWPORT BEACH
LAGUNA BEACH
405
55
73
Bikeway Prioritization:
Newport Beach
OCACTIVE
Bicycle Master Plan Priority
Tier 1
Tier 2
Tier 3
Project Rank
Mi
0
0.2
0.4

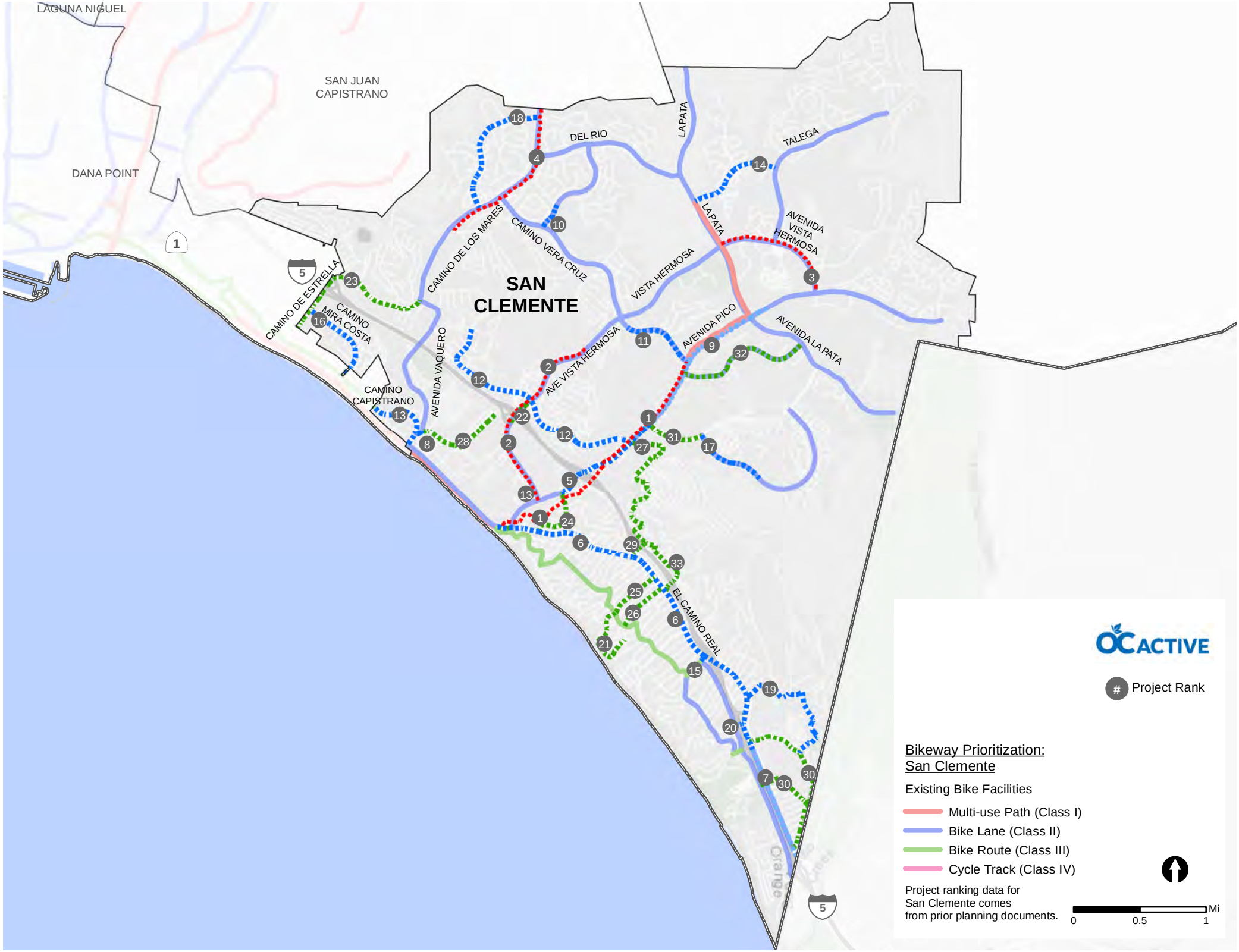

Date: 3/26/2019
ORANGE
VILLA PARK
TUSTIN
SANTA ANA
IRVINE
FOUNTAIN VALLEY
HUNTINGTON BEACH
COSTA MESA
NEWPORT BEACH
LAKE FOREST
SANTIAGO CANYON
405
Bikeway Prioritization:
Unincorporated Orange County
OCACTIVE
Unincorporated
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 23
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 1 2
Miles

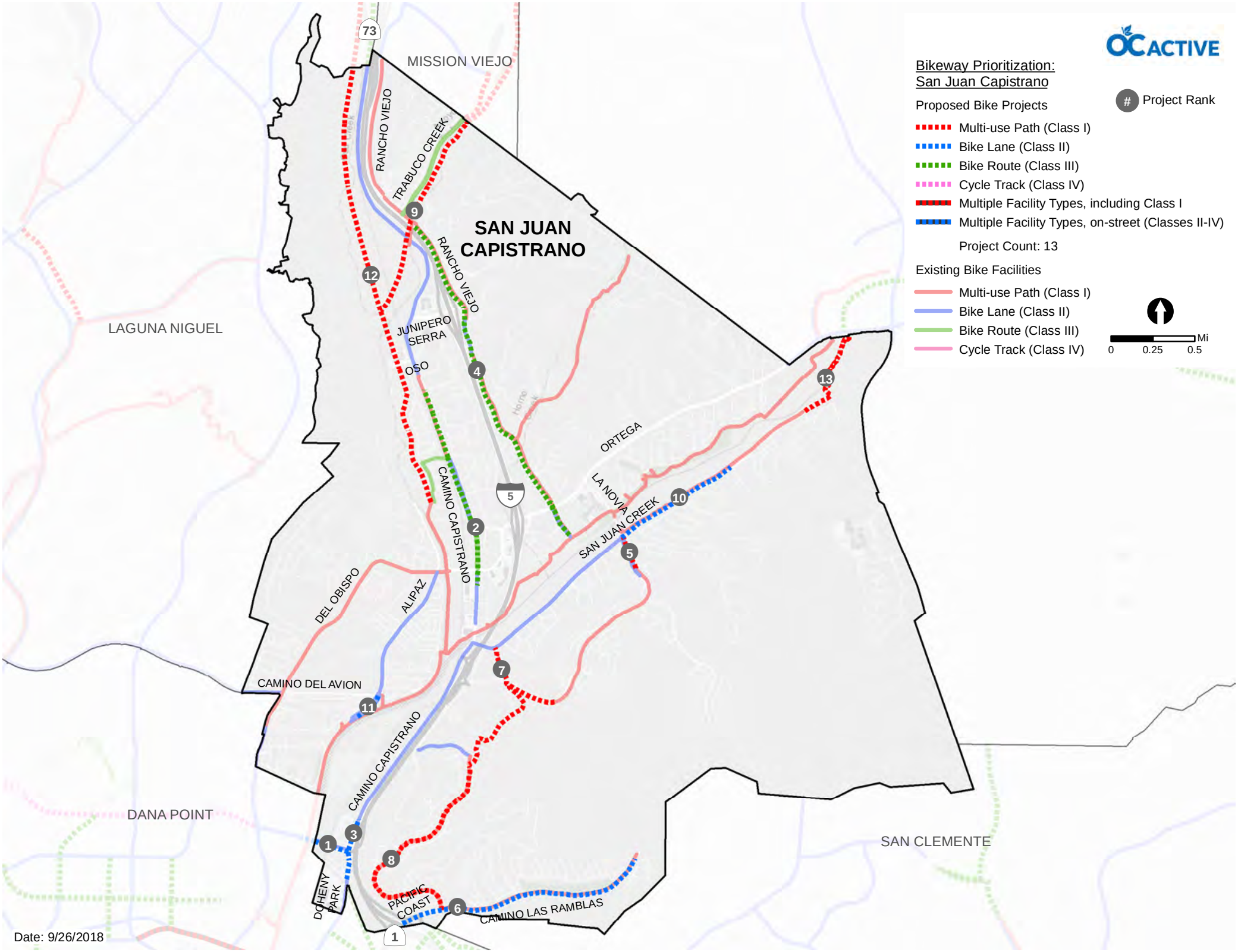

Date: 3/26/2019
LA HARBRA
BREA
YORBA LINDA
FULLERTON
PLACENTIA
ANAHEIM
ORANGE
VILLA PARK
Los Angeles
Orange
15
32
41
44
13
26
38
33
27
16
18
19
3
OCACTIVE
Bikeway Prioritization:
Unincorporated Orange County
Unincorporated
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 13
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0
0.6
1.2
Miles

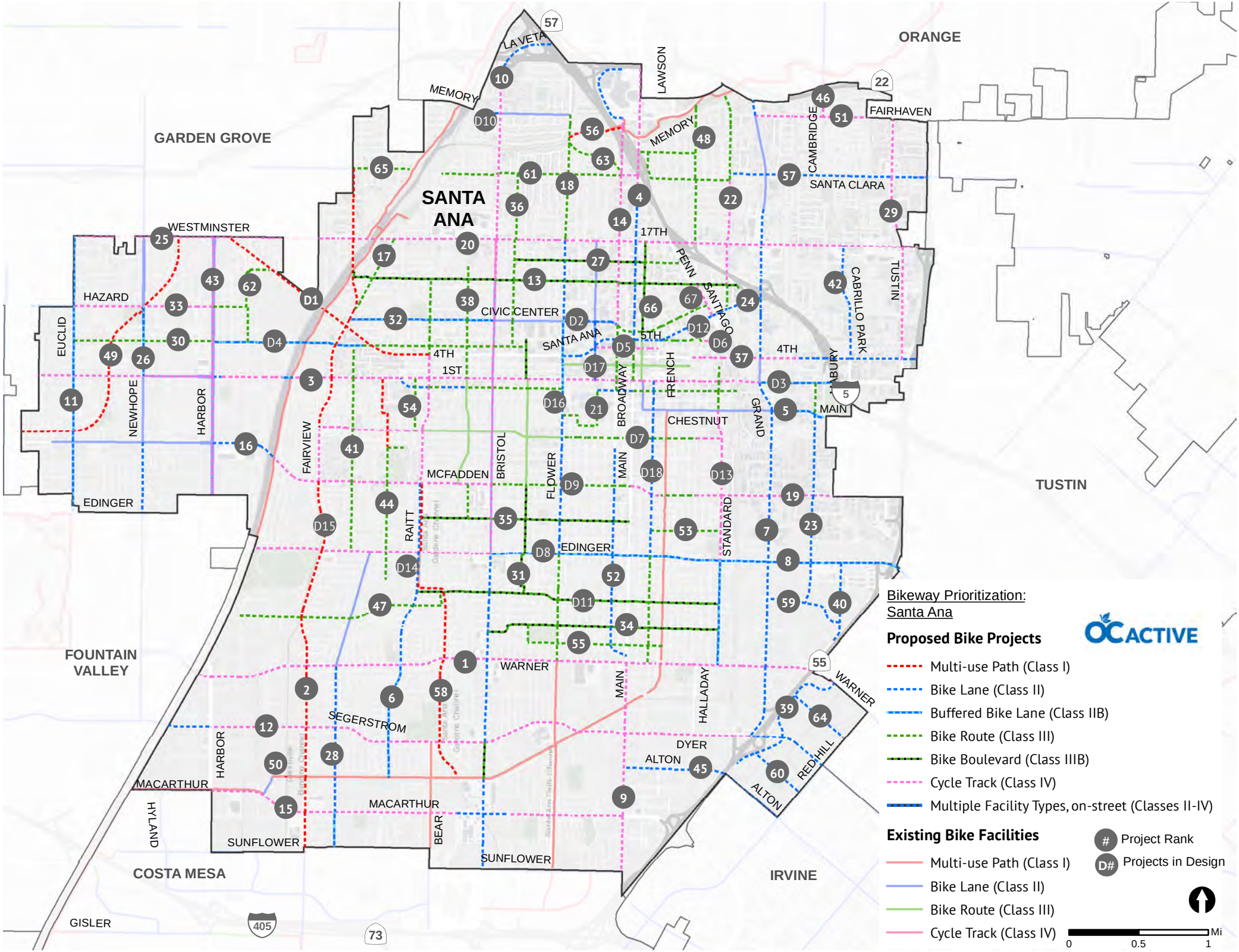

OCACTIVE
Bikeway Prioritization:
Orange
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 48
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.4
0.8
ORANGE
ANAHEIM
VILLA PARK
SANTA ANA
GARDEN GROVE
TUSTIN
IRVINE
FULLERTON
PLACENTIA
YORBA LI
FAIRHAVEN
TOWN AND COUNTRY
LA VETA
CHAPMAN
ORANGEWOOD
WALNUT
COLLINS
KATELLA
MEATS
TAFT
GROVE
LINCOLN
RIVERDALE
ORANGE OLIVE
NOHL RANCH
VIA ESCOLA
SERRANO
SANTIAGO
BATAVIA
GLASSELL
TUSTIN
WANDA
HEWES
CANNON
BOND
SPRING
PROSPECT
ESPLANADE
YORBA
SANTIAGO CANYON
NEWPORT
CANYON VIEW
JAMBOREE
HANDY CREEK
ECKHOFF
MAIN
CAMBRIDGE
STATE COLLEGE
ANAHEIM
MANCHESTER
LEWIS
THE CITY
METROPOLITAN
FLOWER
PLAZA
57
55
5
22
241
261
90
91
Date: 10/7/2019

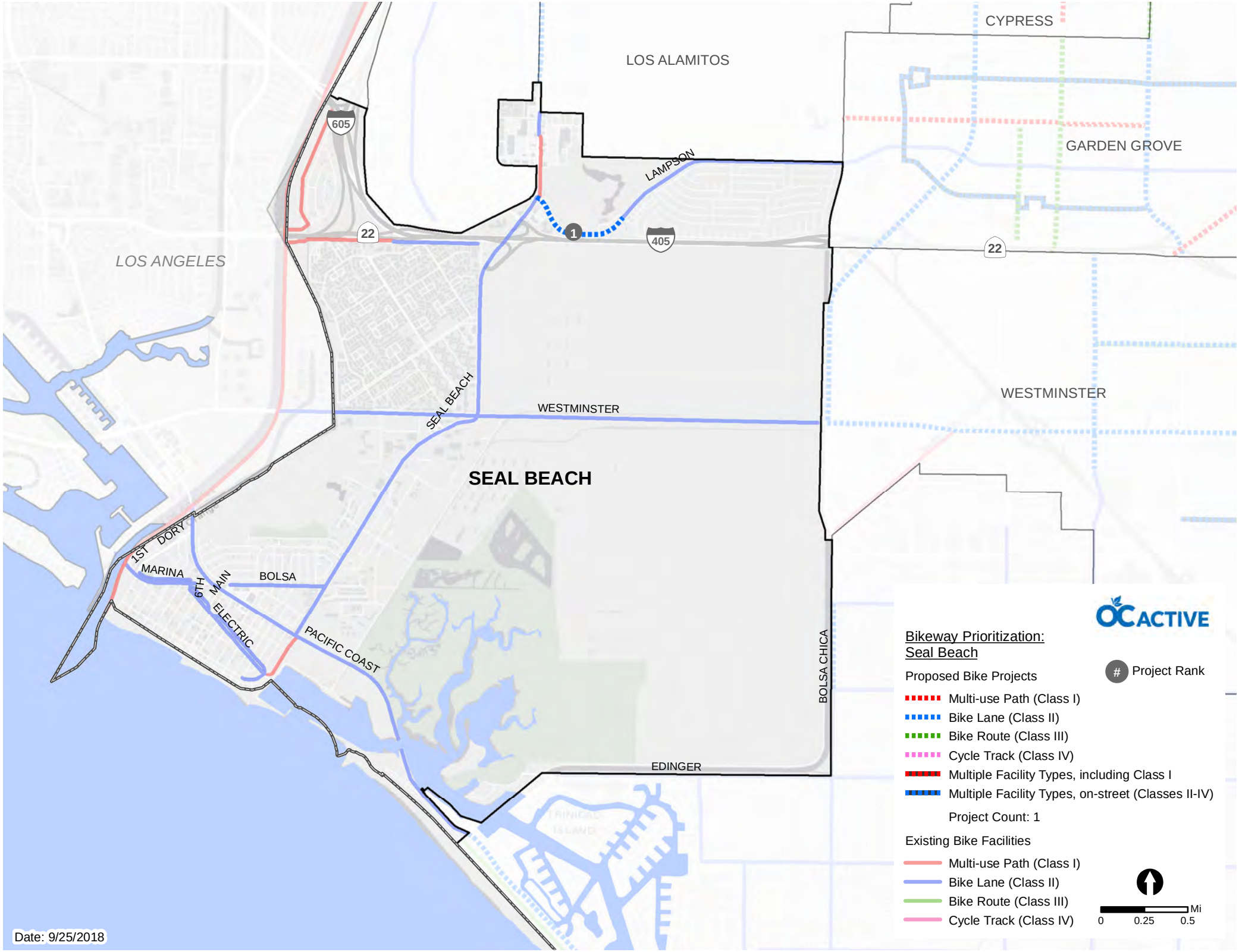

OCACTIVE
Bikeway Prioritization:
Placentia
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 19
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.2
0.4
BREA
FULLERTON
ANAHEIM
PLACENTIA
GOLDEN
IMPERIAL
ROSE
BASTANCHURY
PLACENTIA
VALENCIA
KRAEMER
YORBA LINDA
PALM
BUENA VISTA
MADISON
BRADFORD
ALTA VISTA
CHAPMAN
CROWTHER
MELROSE
ORANGETHORPE
JEFFERSON
RICHFIELD
LAKEVIEW
MIRALOMA
MIRA LOMA
57
90
91
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Date: 9/25/2018

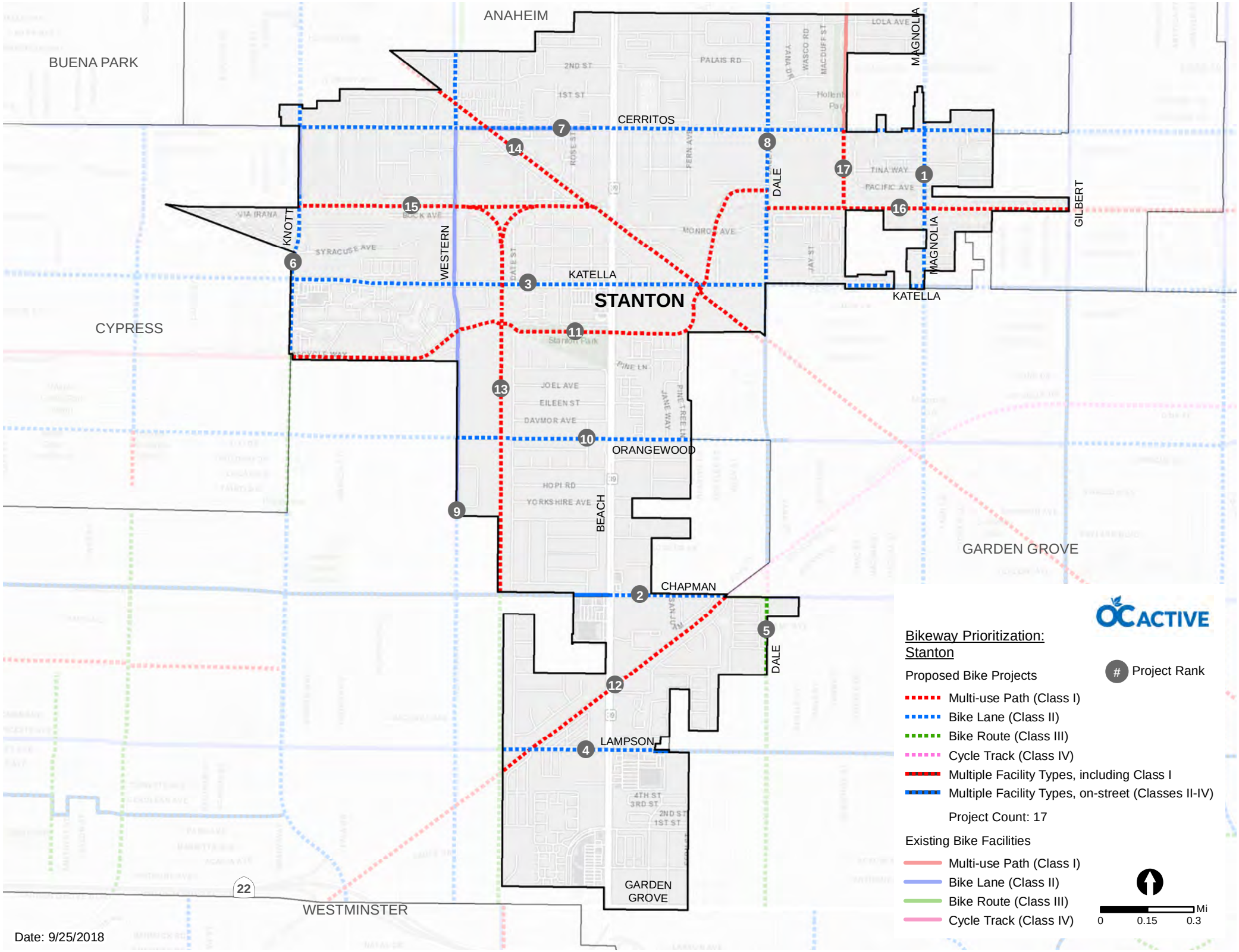

LAKE FOREST
MISSION VIEJO
RANCHO SANTA MARGARITA
LOS ALISOS
MELINDA
AVENIDA DE LAS FLORES
PLANO TRABUCO
ALAS DE PAZ
SANTA MARGARITA
ALMA ALDEA
LA PROMESA
ALICIA
AVENIDA EMPRESA
AVENIDA DE LAS BANDERAS
ANTONIO
241
OSO
1
2
3
OCACTIVE
Bikeway Prioritization:
Rancho Santa Margarita
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 3
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.3 0.6 Mi
Date: 2/6/2019

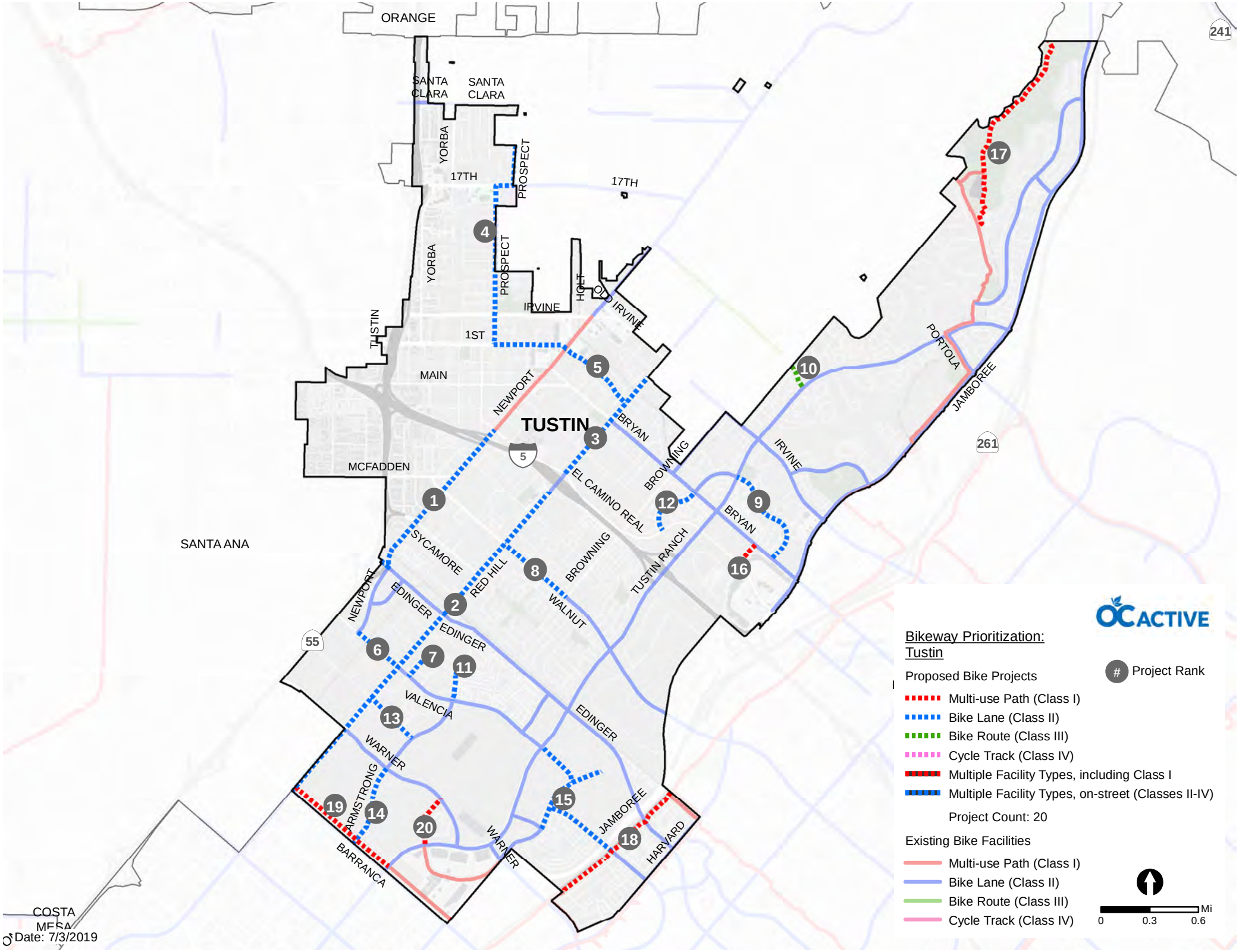

LAGUNA NIGUEL
SAN JUAN CAPISTRANO
DANA POINT
SAN CLEMENTE
DEL RIO
LA PATA
TALEGA
AVENIDA VISTA HERMOSA
CAMINO DE LOS MARES
CAMINO VERA CRUZ
VISTA HERMOSA
CAMINO DE ESTRELLA
CAMINO MIRA COSTA
AVENIDA VAQUERO
AVE VISTA HERMOSA
AVENIDA PICO
AVENIDA LA PATA
CAMINO CAPISTRANO
EL CAMINO REAL
Orange
OCACTIVE
Project Rank
Bikeway Prioritization:
San Clemente
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Project ranking data for
San Clemente comes
from prior planning documents.
0
0.5
1
Mi

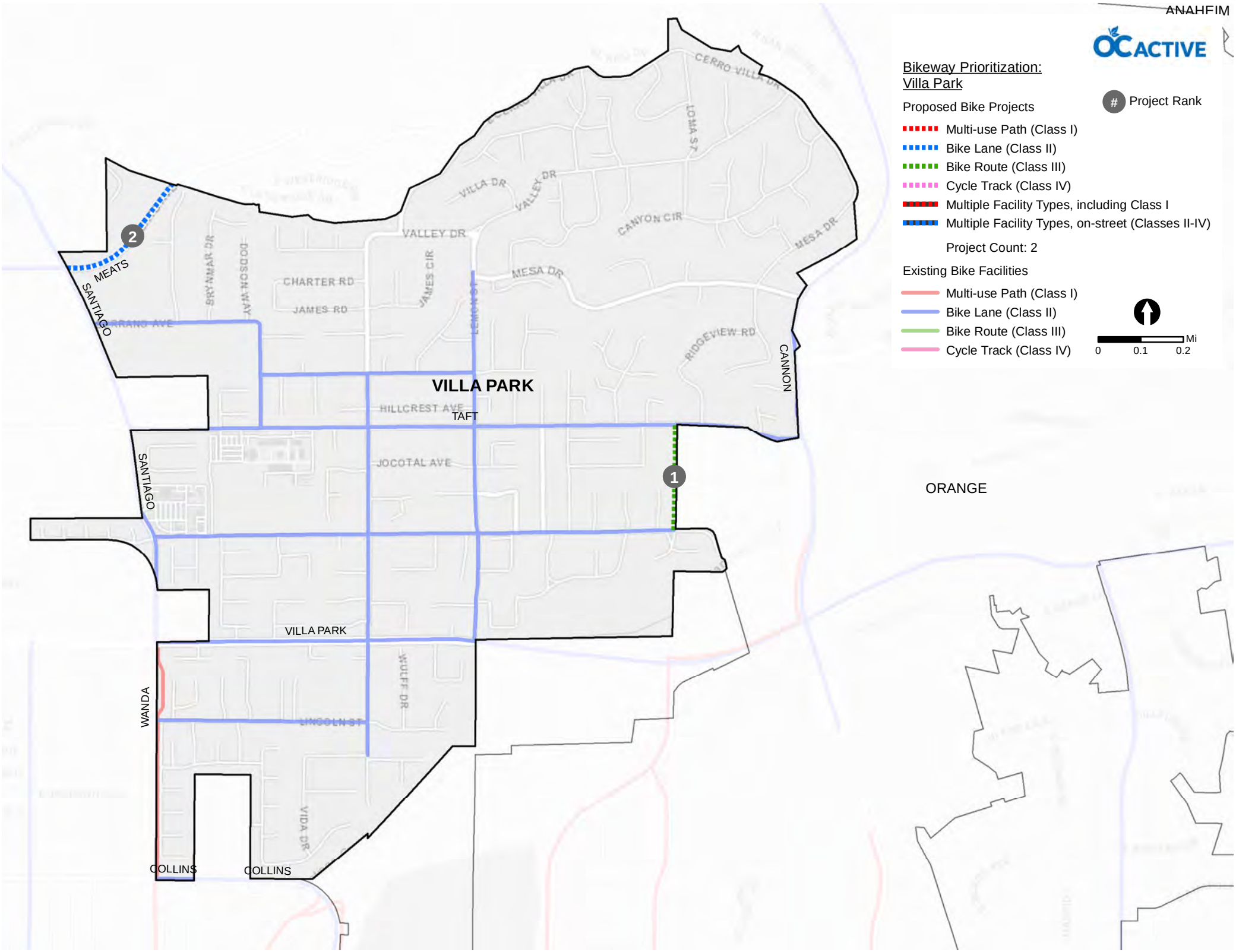

OCACTIVE
Bikeway Prioritization:
San Juan Capistrano
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 13
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.25
0.5
SAN JUAN CAPISTRANO
MISSION VIEJO
LAGUNA NIGUEL
DANA POINT
SAN CLEMENTE
RANCHO VIEJO
TRABUCO CREEK
JUNIPERO SERRA
OSO
CAMINO CAPISTRANO
ORTEGA
LA NOVIA
SAN JUAN CREEK
DEL OBISPO
ALIPAZ
CAMINO DEL AVION
DOHENY PARK
PACIFIC COAST
CAMINO LAS RAMBLAS
73
5
1
Date: 9/26/2018

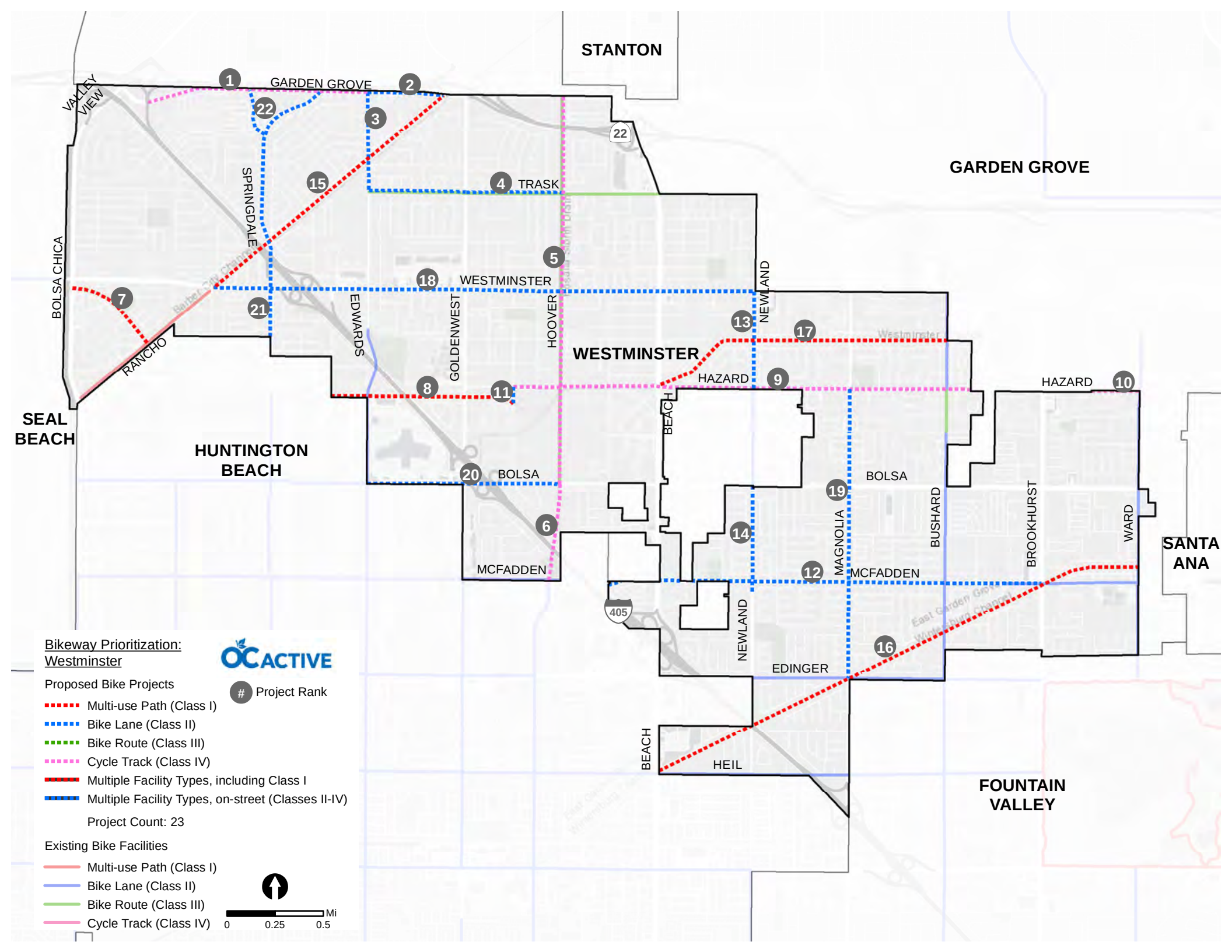

SANTA ANA
GARDEN GROVE
ORANGE
FAIRHAVEN
SANTA CLARA
TUSTIN
WESTMINSTER
FOUNTAIN VALLEY
COSTA MESA
IRVINE
LA VETA
MEMORY
LAWSON
CAMBRIDGE
17TH
PENN
SANTIAGO
CABRILLO PARK
HAZARD
EUCLID
NEWHOPE
HARBOR
CIVIC CENTER
SANTA ANA
5TH
4TH
1ST
FRENCH
BROADWAY
GRAND
MAIN
CHESTNUT
FAIRVIEW
BRISTOL
FLOWER
MCFADDEN
EDINGER
RAITT
STANDARD
WARNER
HALLADAY
DYER
ALTON
REDHILL
SEGERSTROM
MACARTHUR
HAYLAND
BEAR
SUNFLOWER
GISLER
57
22
5
405
73
55
Bikeway Prioritization:
Santa Ana
OCACTIVE
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Buffered Bike Lane (Class IIB)
Bike Route (Class III)
Bike Boulevard (Class IIIB)
Cycle Track (Class IV)
Multiple Facility Types, on-street (Classes II-IV)
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Project Rank
D# Projects in Design
Mi
0
0.5
1

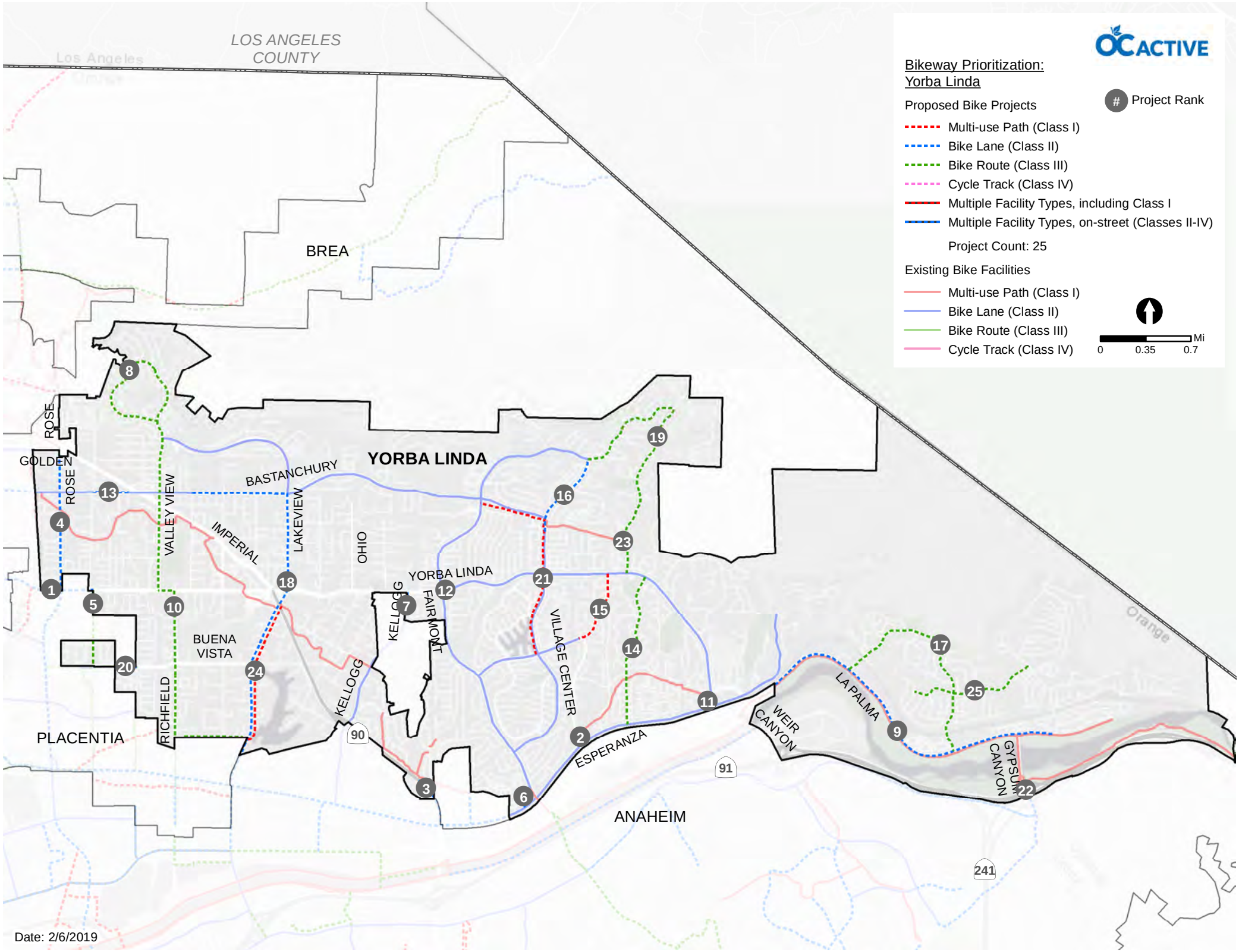

CYPRESS
LOS ALAMITOS
GARDEN GROVE
LOS ANGELES
WESTMINSTER
SEAL BEACH
605
22
405
1
LAMPSON
SEAL BEACH
WESTMINSTER
1ST
DORY
MARINA
6TH
MAIN
BOLSA
ELECTRIC
PACIFIC COAST
BOLSA CHICA
EDINGER
OCACTIVE
Bikeway Prioritization:
Seal Beach
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 1
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.25
0.5
Date: 9/25/2018


ANAHEIM
BUENA PARK
CERRITOS
STANTON
KATELLA
CYPRESS
GARDEN GROVE
CHAPMAN
ORANGEWOOD
LAMPSON
WESTMINSTER
22
MAGNOLIA
DALE
GILBERT
KNOTT
WESTERN
BEACH
LOLA AVE
PALAIS RD
2ND ST
1ST ST
TINA WAY
PACIFIC AVE
VIA IRANA
SYRACUSE AVE
BUCK AVE
MONROE AVE
JOEL AVE
EILEEN ST
DAVMOR AVE
PINE LN
HOPI RD
YORKSHIRE AVE
4TH ST
3RD ST
2ND ST
1ST ST
Bikeway Prioritization:
Stanton
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 17
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.15
0.3
Date: 9/25/2018


ORANGE
SANTA CLARA
SANTA CLARA
YORBA
17TH
PROSPECT
17TH
YORBA
PROSPECT
HOLT
OLD IRVINE
IRVINE
TUSTIN
1ST
MAIN
NEWPORT
TUSTIN
BRYAN
MCFADDEN
5
EL CAMINO REAL
BROWNING
IRVINE
PORTOLA
JAMBOREE
241
261
SANTA ANA
SYCAMORE
RED HILL
BROWNING
WALNUT
TUSTIN RANCH
BRYAN
NEWPORT
EDINGER
EDINGER
55
VALENCIA
EDINGER
WARNER
ARMSTRONG
JAMBOREE
HARVARD
WARNER
BARRANCA
COSTA MESA
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OCACTIVE
Bikeway Prioritization:
Tustin
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 20
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0
0.3
0.6
Mi
Date: 7/3/2019


ANAHEIM
OCACTIVE
Bikeway Prioritization:
Villa Park
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 2
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.1 0.2 Mi
VILLA PARK
ORANGE
2
1
MEATS
SANTIAGO
SERRANO AVE
SRYNMAR DR
DODSON WAY
CHARTER RD
JAMES RD
JAMES CIR
VALLEY DR
VILLA DR
VALLEY DR
CERRO VILLA DR
LOMA ST
CANYON CIR
MESA DR
MESA DR
LEMON ST
RIDGEVIEW RD
CANNON
HILLCREST AVE
TAFT
JOCOTAL AVE
SANTIAGO
VILLA PARK
WOLFF DR
WANDA
LINCOLN ST
VIDA DR
COLLINS
COLLINS

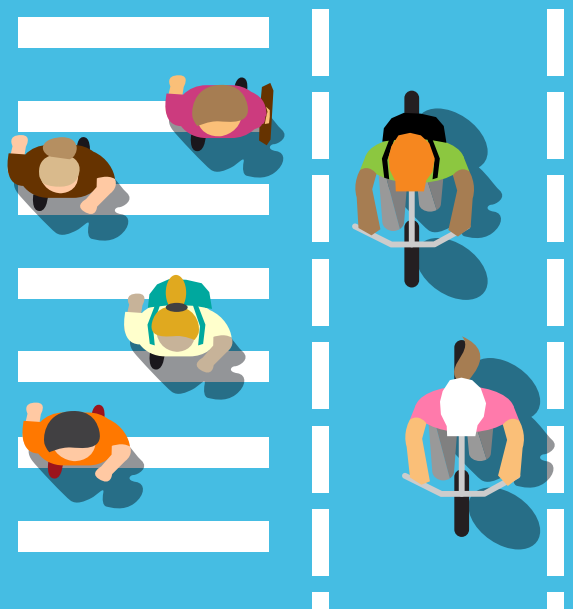

STANTON
GARDEN GROVE
VALLEY VIEW
SPRINGDALE
BOLSA CHICA
RANCHO
EDWARDS
GOLDENWEST
HOOVER
NEWLAND
TRASK
WESTMINSTER
HAZARD
BEACH
MAGNOLIA
BUSHARD
BROOKHURST
WARD
BOLSA
MCFADDEN
EDINGER
HEIL
405
22
SEAL BEACH
HUNTINGTON BEACH
SANTA ANA
FOUNTAIN VALLEY
Bikeway Prioritization: Westminster
OCACTIVE
Proposed Bike Projects
Project Rank
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 23
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Mi
0
0.25
0.5


OCACTIVE
Bikeway Prioritization:
Yorba Linda
Project Rank
Proposed Bike Projects
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
Multiple Facility Types, including Class I
Multiple Facility Types, on-street (Classes II-IV)
Project Count: 25
Existing Bike Facilities
Multi-use Path (Class I)
Bike Lane (Class II)
Bike Route (Class III)
Cycle Track (Class IV)
0 0.35 0.7 Mi
LOS ANGELES COUNTY
BREA
YORBA LINDA
PLACENTIA
ANAHEIM
GOLDEN
ROSE
BASTANCHURY
VALLEY VIEW
LAKEVIEW
IMPERIAL
OHIO
KELLOGG
FAIRMONT
BUENA VISTA
RICHFIELD
VILLAGE CENTER
ESPERANZA
WEIR CANYON
LA PALMA
GYPSUM CANYON
Orange
90
91
241
Date: 2/6/2019

A.7 Bicycle & Pedestrian Best Practices Toolkit

OC ACTIVE

BICYCLE & PEDESTRIAN BEST PRACTICES TOOLKIT 2018



OCTA

MAY 2018

Prepared for: Orange County Transportation Authority

Prepared by: IBI Group with KTUA, PlaceWorks, and Arellano Associates

IBI

This page intentionally left blank.

CONTENTS

This page intentionally left blank.

INTRODUCTION

PURPOSE OF THE TOOLKIT

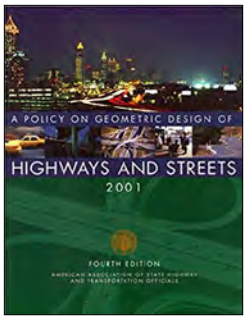
Walkability, bikeability, and accessibility are common elements found in healthy and vibrant communities. Communities that are walkable and accessible provide a range of benefits that improve the quality of life for residents and visitors. These benefits often include:

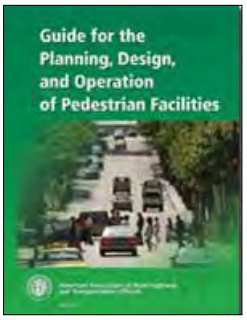
- **A reliable bicycle and pedestrian network with access to interesting and diverse destinations**
- **Direct and accessible connections to transit**
- **Well-maintained infrastructure that is inclusive of varying mobility needs**
- **Clear and inviting spaces, such as trails, paseos, or other public open spaces**
- **Improved public health and safety**

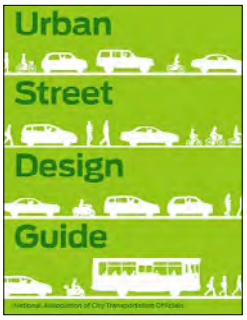
The OC Active Bicycle and Pedestrian Best Practices Toolkit provides local jurisdictions with a diverse range of tools and strategies for promoting and improving bicycle and pedestrian activity and safety in Orange County. The toolkit is intended to serve as a one-stop resource to a broad range of bicycle and pedestrian planning topics, tools, and strategies. The information presented in this toolkit should not be interpreted as standards, specifications, or regulations, but rather as tools and strategies for promoting more bicycle and pedestrian activity within Orange County. The strategies in this toolkit should be applied with sound professional judgement to achieve the design solutions necessary for the specific circumstances encountered.

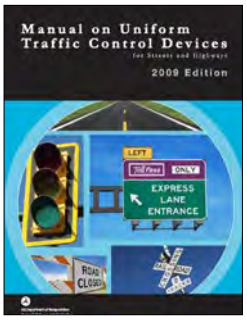
STANDARDS/GUIDELINES

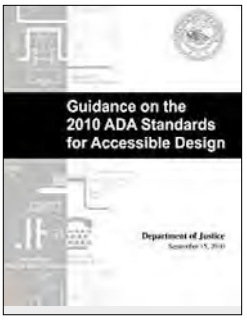
The OC Active Bicycle and Pedestrian Best Practices Toolkit draws from a variety of national, state, and local resources and is tailored to meet the unique characteristics of Orange County. Although the information presented in this toolkit provides local jurisdictions with tools and strategies for promoting more bicycle and pedestrian activity, bicycle and pedestrian infrastructure should be designed and built according to existing federal, state, and local standards. This section describes some key national, state, and local standards and guidelines that are available for the planning and design of bicycle and pedestrian infrastructure.











NATIONAL STANDARDS AND GUIDELINES

The following national resources are available:

- American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 2001
- AASHTO, Guide for the Development of Bicycle Facilities, 2012
- AASHTO, Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004
- Federal Highway Administration (FHWA), Manual on Uniform Traffic Control Devices (MUTCD), 2009
- National Association of City Transportation Officials (NACTO), Urban Street Design Guide, 2013
- NACTO, Urban Bikeway Design Guide, 2011
- U.S. Access Board, American Disabilities Act Accessibility Guidelines (ADAAG), 2002
- U.S. Department of Justice, American Disabilities Act (ADA) Standards for Accessible Design, 2010

STATE STANDARDS AND GUIDELINES

The following state resources are available:

- California Department of Transportation (Caltrans) – California Manual on Uniform Traffic Control Devices (CA MUTCD), 2014
- Caltrans – Highway Design Manual, Chapter 1000: Bicycle Transportation Design, 2015
- Caltrans – Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians, 2010

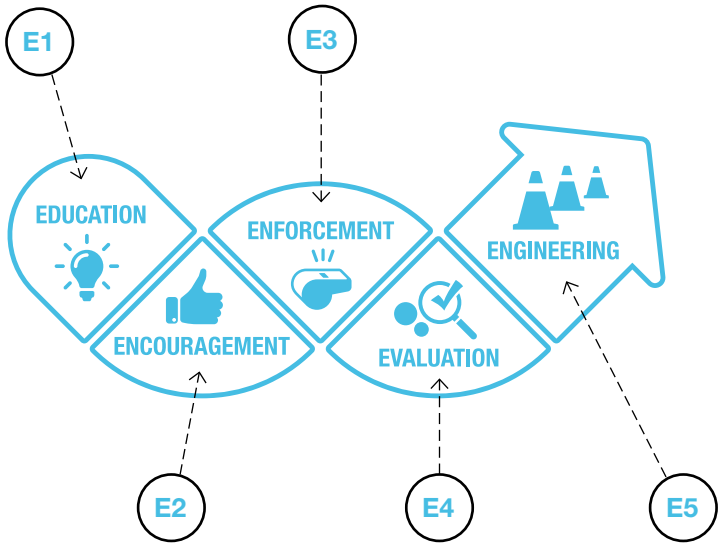
LOCAL STANDARDS AND GUIDELINES

The following local resources are available:

- Orange County Transportation Authority (OCTA) – Master Plan of Arterial Highways Guidelines (MPAH), 2017
- Orange County Council of Governments (OCCOG) – Complete Streets Initiative Design Handbook, 2016

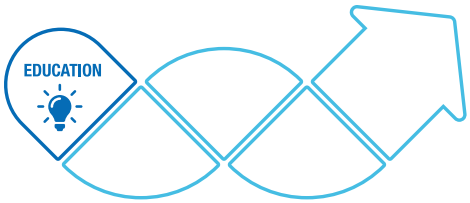
TOOLKIT ORGANIZATION AND THE FIVE E'S

Safer bicycling and walking conditions are best achieved through a combination of strategies targeted to address both infrastructure and non-infrastructure needs. The tools and strategies discussed in this toolkit are organized around the Five E's, a universal framework and approach to improving roadway safety often used by planning practitioners. The **Five E**'s framework includes the following categories:



By focusing on the Five E's, the OC Active Bicycle and Pedestrian Best Practices Toolkit incorporates a comprehensive and holistic approach to bicycle and pedestrian planning. The subsequent sections of the toolkit discusses the benefits of each of the Five E's and includes sample tools and strategies for each E.

This page intentionally left blank.



1. EDUCATION

Bicycle and pedestrian education campaigns can help local jurisdictions communicate the skills and knowledge necessary to be safe bicyclists and pedestrians. They help inform community members of traffic safety laws, facilitate safe bicycling and walking behavior and practices, and communicate common unsafe bicycle and pedestrian practices that lead to collisions. Education campaigns can include a variety of tools such as community outreach, developing local bicycle and pedestrian safety guides, hosting safe routes to school education workshops, and more.

BENEFITS

Some of the benefits of facilitating bicycle and pedestrian education campaigns include:

- Informing and reinforcing safe bicycle and pedestrian behavior and practices.
- Improving bicyclist and pedestrian safety by teaching safe biking and walking practices.
- Providing motivation to change unsafe bicyclist and pedestrian behaviors.
- Communicating traffic safety laws.
- Demonstrating that vehicles, bicycles, and pedestrians can share the road safely.
- Giving community members the skills and confidence to ride and walk.
- Providing decision makers with tools and strategies to make improvements that are appropriate for their community.

EXAMPLES

COMMUNITY OUTREACH TOOLS

Engaging community members through outreach can help communicate the importance of safe pedestrian practices and the benefits of walking. Communicating these key messages to community members can help garner support for future pedestrian infrastructure projects and polices, but local jurisdictions often have trouble with designing an effective outreach strategy that engages, encourages participation, and solicits feedback. Some successful community outreach strategies have incorporated the following tools:

- **Interactive Technologies and Tools:** Effective outreach strategies go beyond the conventional methods to engage, such as town hall meetings or open house workshops, and focus on incorporating interactive tools to make it fun. New digital technologies can help facilitate and streamline the outreach process and increase participation and interaction. Some of these interactive technologies and tools include:
  - **Poll Everywhere Surveys:** Poll Everywhere is an online service for audience polling. In a community outreach context, it allows facilitators to create poll questions that audience can answer by using their mobile phones to text their responses. Live results of each poll question can be displayed on-screen during presentations. It's a unique way to incorporate interactive and live activities during a presentation.
  - **Web-based Mapping:** Web-based mapping tools, such as ArcGIS Online, CrowdMap, and CommunityRemarks, allow community members to identify key areas on a map and leave comments. They can be useful to identifying problematic and unsafe areas, as well as communicating desired infrastructure improvements.
- **Visualization Tools:** Graphics are important to communicate key information and data to audiences in an easy to understand format. Websites, such as Street Mix, allow users to create a visual mockup of their ideal street by dragging and dropping various elements such as street trees, sidewalks, bike lanes, etc. onto its online and shareable interface.

DEVELOP LOCAL PUBLIC EDUCATION AND SAFETY CAMPAIGNS

Developing local public education and safety campaigns is a useful tool to teach safe walking tips to communities. Education and safety campaigns focus on encouraging community members to think about their existing travel choices and pedestrian behaviors, as well as helping community members make safer more informed choices. Education and safety campaigns should consider the sensitivities and different needs of different groups of people, such as children, adults, and seniors. The following are some example public education and safety tools.

- **Pedestrian Education Guides:** The Pedestrian and Bicycle Information Center developed a series of pedestrian education guides for different age and community groups. An education guide was developed for different age groups because the skills and knowledge needed to walk safely changes as people age. Each guide provides strategies and tips for educating pedestrians, highlights which key messages to convey, and provides a link for additional resources.
- **Los Angeles County Suggested Pedestrian Route to School Website:** The County of Los Angeles Department of Public Works developed its Suggested Pedestrian Route to School website, which

contains maps of suggested pedestrian walking routes for a majority of elementary schools in Los Angeles County. Each map includes key information to inform safe suggested routes to school, such as the locations of crossing guards, stop signs, crosswalks, signal lights, pedestrian bridges, and school entrances. The maps help inform parents of safe routes for children to take when walking to school.

SAFE ROUTES TO SCHOOL EDUCATION WORKSHOPS

The Safe Routes to School (SRTS) National Partnership is a nonprofit organization committed to promoting safe walking and biking to school and beyond. They often partner with local jurisdictions to provide workshops and trainings on safe routes to school, active transportation policy and programming, funding for sustainable transportation, as well as community engagement and coalition development. Each workshop and training is customizable to fit the needs of the community and can be offered in-person or online.

LEAGUE OF AMERICAN BICYCLISTS SMART CYCLING CLASSES AND LEAGUE CYCLING INSTRUCTOR (LCI) SEMINARS

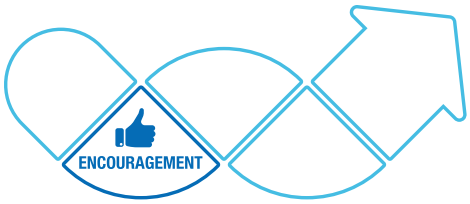
The League of American Bicyclists (LAB) provides Smart Cycling classes across the nation designed to reach people of all ages and abilities, improving skills, building confidence, and teaching others. The League's education program also offers the only nationwide bicycling instructor certification program, known as League Cycling Instructors, who are certified to teach the Smart Cycling Classes to children as well as adults.

CYCLING SAVVY CLASSES

CyclingSavvy is a program of the American Education Association, Inc. (ABEA). The course teaches the principles of "Mindful Bicycling" by empowering students to act as confident, equal road users, teaching strategies for safe integrated cycling, and providing tools to read and problem-solve a variety of traffic situations. The class consists of three 3-hour components: a bike-handling session, a classroom session, and an on-road tour.

ADDITIONAL INFORMATION

- **CommunityRemarks**
  https://communityremarks.com/
- **County of Los Angeles Department of Public Works, Suggested Pedestrian Route to School**
  http://dpw.lacounty.gov/tnl/schoolroute/
- **Orange County Bicycle Coalition, CyclingSavvy Program**
  https://www.bikeleague.org/content/become-instructor
- **Pedestrian and Bicycle Information Center, How to Educate Pedestrians and Bicyclists**
  http://www.pedbikeinfo.org/programs/education.cfm
- **Pedestrian and Bicycle Information Center, Safety Tips for Pedestrians**
  http://www.pedbikeinfo.org/community/tips_pedestrian.cfm
- **Poll Everywhere**
  https://www.polleverywhere.com/
- **Safe Routes to School National Partnership**
  https://www.saferoutespartnership.org/
- **League of American Bicyclists, League Cycling Instructor Program**
  https://www.bikeleague.org/content/become-instructor
- **League of American Bicyclists, Smart Cycling Program**
  https://www.bikeleague.org/ridesmart
- **Street Mix**
  https://streetmix.net
- **Vermont Safe Routes to School, Teaching Walking and Biking Safety Mini Guide**
  http://saferoutes.vermont.gov/sites/saferoutes/files/TeachingWalkingBikingSafety.pdf



2. ENCOURAGEMENT

Encouraging bicycle and pedestrian activity helps to generate excitement and brings awareness to the benefits of active transportation. It can also help foster public support for bikeway and pedestrian infrastructure projects and policies that are geared towards improving safety on streets. Tools to encourage bicycle and pedestrian activities include promoting national and local active transportation events, implementing local tactical urbanism events, and adopting local policies and programs that support safe and efficient active modes of transportation.

BENEFITS

Some benefits of encouraging bicycle and pedestrian activity in communities include:

- Inspiring adults and children to engage in healthy and sustainable modes of transportation.
- Demonstrating that active modes of transportation are welcome and encouraged.
- Communicating the benefits of active transportation and garnering community support for bikeway and pedestrian projects.
- Fostering a stronger sense of community.
- Promoting safer and healthier communities.

EXAMPLES

PROMOTE NATIONAL AND LOCAL ACTIVE TRANSPORTATION EVENTS

Promoting nationally recognized active transportation events, such as Walk and Bike to School Day, Pedestrian Safety Month, and Bike Month, or hosting special local events, such as walking and biking contests, can help generate excitement and encourage more bicycling and walking in communities. These events communicate and celebrate the benefits of active transportation and often inspire continued bicycle and pedestrian activity beyond the day or event.

IMPLEMENT LOCAL TACTICAL URBANISM EVENTS

Tactical urbanism is a community approach to improving the built environment and includes implementing low-cost temporary design solutions to catalyze long-term change. The goal of most tactical urbanism projects is to improve local streets and neighborhoods by implementing quick, scalable, low-cost design solutions that are temporary in hopes of garnering support for permanent infrastructure improvements and change.

- **Go Human:** The Southern California Association of Governments (SCAG) Go Human campaign is a regional campaign intended to promote and improve conditions for active modes of transportation funded by a $2.3 million grant from the 2014 California Active Transportation Program. The campaign provides funding for local jurisdictions to implement their own local tactical urbanism events to encourage active transportation. The Go Human campaign also provides information on potential strategies, case studies, enforcement strategies, and other resources that local jurisdictions can use to promote and encourage more walking and biking in their communities.

- **Re:Imagine Garden Grove:** The Re:Imagine Garden Grove event is a recent example of a tactical urbanism event funded by the Go Human campaign. The event encouraged community members to envision a car-free Garden Grove by closing select streets to vehicular traffic, creating a car-free zone. The event created a temporary 2.5 mile car-free route, prioritizing travel for pedestrians, bicyclists, and skateboarders. The Re:Imagine Garden Grove event successfully demonstrated to community members the possibilities and various design solutions available for making streets safer for pedestrians and bicyclists.

- **Go Human Riverside Artswalk Pedestrian Scrambles:** The City of Riverside partnered with SCAG's Go Human campaign to install two temporary pedestrian scrambles for a three week pilot project. Pedestrian scrambles prioritize the safe movement of pedestrians by stopping all vehicular traffic in all directions and allowing pedestrians an exclusive interval to cross an intersection in all directions, including diagonally, at the same time. The pilot project coincided with the monthly Riverside Artswalk in downtown Riverside and used the opportunity to showcase pop-up scramble crosswalks and corner sidewalk extensions that were designed and created by local artists. The temporary installations were incorporated as a part of the Riverside Artswalk and highlighted in the Riverside Artswalk map, which were distributed to visitors. Additionally, as a part of the pilot project, data was collected on how many people used the modified crosswalks, delays to vehicular traffic, and other impacts. The data collection in conjunction with feedback from community members will be used by the City in their decision to implement permanent pedestrian scrambles.

- **CicLAvia:** CicLAvia is an open streets event that occurs in cities across in Los Angeles County several times a year. Many events have been organized since 2010, providing spaces for families and friends to enjoy spaces that may have otherwise only been used primarily by automobiles. CicLAvia occurs in several different areas in order to reach the various populations of Los Angeles County.
- **SOMOS:** Similar to Los Angeles' CicLAvia, the City of Santa Ana has previously hosted the City's Sunday on Main Open Streets (SOMOS) event, closing a section of Central Santa Ana off to cars and opening it to bicyclists, walkers, and runners. The event encourages residents to attend by providing entertainment and activities along the 3.1 mile route connecting Santa Ana's vibrant downtown to its historic South Main Corridor.

ADOPTING VISION ZERO

Vision Zero is a traffic safety strategy that focuses on eliminating traffic fatalities and severe injuries, while promoting safe, healthy, and equitable mobility. Cities across the U.S. have begun developing and adopting Vision Zero initiatives in response to traffic deaths and severe injuries experienced in their communities. Vision Zero incorporates a multi-disciplinary systems approach, bringing together a variety stakeholders from different city departments, such as traffic planners and engineers, police officers, policymakers, and public health professionals, to determine appropriate solutions for eliminating traffic deaths and severe injuries. Successful solutions and strategies have included:

- Reducing speed limits
- Redesigning streetscapes
- Implementing behavior change campaigns for motorists, bicyclists, and pedestrians
- Enhancing data-driven traffic enforcement

Vision Zero initiatives represent a commitment from local jurisdictions and elected officials to prioritizing safer streets both in policy and practice.

NATIONAL BIKE MONTH

National Bike Month is held in May of each year. Established in 1956 and sponsored by the League of American Bicyclists (LAB), it encourages local jurisdictions all across the United States to develop programs and events to promote bicycling to work, school, as well as for recreation. OCTA celebrates National Bike Month with events such as the OCTA Bike Rally and the OCTA Bike Festival at the Dana Point Grand Prix. During Bike to Work Week within Bike Month, Metrolink offers free rides to passengers who bring a bike onboard the train to encourage people to bike to transit connections. In 2017, Metrolink also partnered with the Los Angeles Metropolitan Transportation Authority (Metro) to offer a free month of bike share rides to 2,000 Metrolink riders.

BICYCLE FRIENDLY COMMUNITY DESIGNATION

Through its Bicycle Friendly America (BFA) program, the League of American Bicyclists (LAB) recognizes communities that improve bicycling conditions through education, encouragement, enforcement, and evaluation programs. Communities can achieve platinum, gold, silver, or bronze status, or an honorary mention. Bicycle friendliness can indicate that a community is healthy and vibrant. Bicycle friendliness can increase property values, spur business growth, and increase tourism. Details on obtaining bike friendly community status can be found on LAB's website.

BICYCLE AND PEDESTRIAN PLANNING POLICIES AND PROGRAMS

Pedestrian planning policies can help transform the broad focus of various plan efforts into distinct actionable priorities. They help provide the direction necessary for cities to prioritize and implement projects and programs that support plan goals and objectives. Some example planning policies and programs specific to improving bicycle and pedestrian safety include:

- Implementing a pedestrian signal policy that prioritizes the safe movement of pedestrians
- Adopting a Vision Zero policy and communication strategy
- Developing a complete streets policy (as required by AB1358)
- Developing a SRTS program
- Developing a citywide wayfinding program

Local jurisdictions can also encourage and promote more bicycle and pedestrian activity by ensuring future neighborhood plans, specific plans, and corridor plans contain design standards and principles that support bicycle and pedestrian connections and activity throughout the surrounding built environment. Best practices for encouraging bicycle and pedestrian activity in these local community plans include:

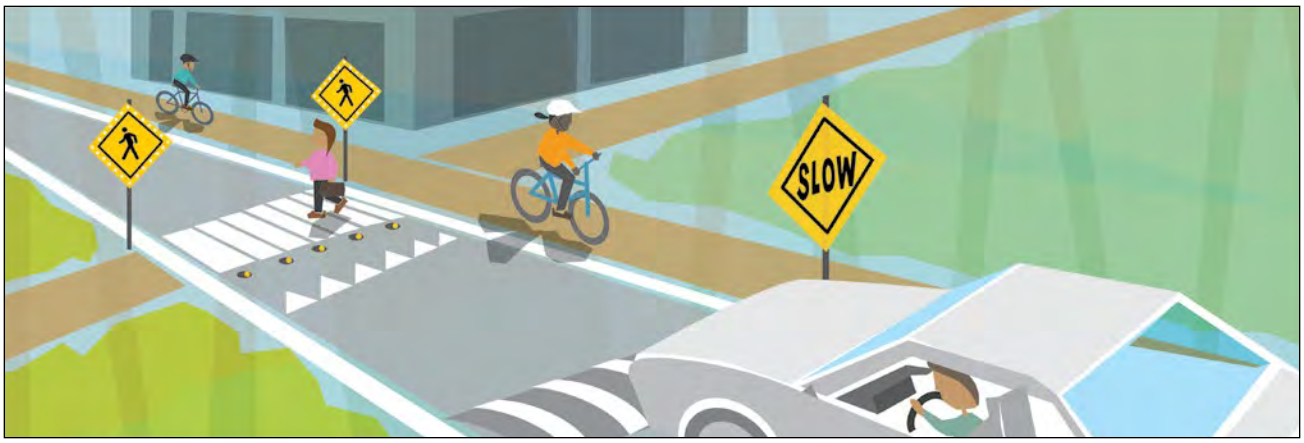
- Emphasizing bicycle- and pedestrian-oriented design features and placemaking.
- Developing streetscape plans that create a comfortable, convenient, safe, bikeable, and walkable environment with bicycle and pedestrian features and amenities.
- Implementing form-based codes that emphasize bicycle- and pedestrian-scaled building facades, short block lengths, bike buffers, pedestrian buffers, and other urban design features.
- Incorporating mixed-use zones and moderate to high development densities where feasible.

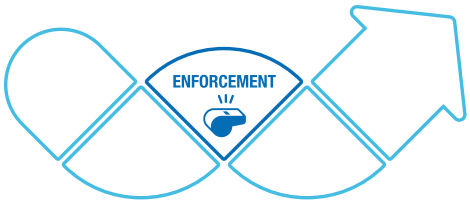
ADDITIONAL INFORMATION

- **CicLAvia**
  http://www.ciclavia.org/
- **City of Santa Ana, Downtown Transit Zone Complete Streets Plan**
  http://www.ci.santa-ana.ca.us/completestreets/DowntownTransitZoneCompleteStreetPlan.asp
- **City of Santa Ana, Harbor Mixed Use Transit Corridor Plan**
  http://www.santa-ana.org/pba/planning/HarborMixedUseTransitCorridorPlan.asp
- **City of Santa Ana, SOMOS**
  http://www.ci.santa-ana.ca.us/parks/somos/
- **FHWA, Noteworthy Local Policies that Support Safe and Complete Pedestrian and Bicycle Networks, 2016**
  https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa17006-Final.pdf
- **League of American Bicyclists, Bicycle Friendly America Program**
  http://www.bikeleague.org/bfa
- **League of American Bicyclists, National Bike Month**
  https://bikeleague.org/bikemonth
- **Metrolink, National Bike Month 2017**
  https://www.metrolinktrains.com/news/metrolink-news/metrolink-celebrates-national-bike-month-with-events-and-contests-to-promote-cycling/
- **OCTA, National Bike Month 2017**
  http://www.octa.net/Bike-Month-2017/

- **Reimagine Garden Grove**
  http://ggopenstreets.com/
- **SCAG Go Human**
  http://gohumansocal.org/Pages/Home.aspx
- **Street Plans Collaborative, Tactical Urbanist's Guide to Materials and Design, 2016**
  http://tacticalurbanismguide.com/guides/tactical-urbanists-guide-to-materials-and-design/
- **Street Plans Collaborative, San Francisco Planning Department, and MJM Management, Public Space Stewardship Guide, 2016**
  http://sf-planning.org/public-space-stewardship-guide
- **Street Plans Collaborative, The Alliance for Biking and Walking, and The Fund for the Environment and Urban Life, The Open Streets Guide, 2012**
  http://tacticalurbanismguide.com/guides/the-open-streets-guide/
- **Tactical Urbanist's Guide**
  http://tacticalurbanismguide.com/
- **Vermont Safe Routes to School Walk and Roll to School Days Mini Guide**
  http://saferoutes.vermont.gov/sites/saferoutes/files/WalkandRoll.pdf
- **Vision Zero Network**
  https://visionzeronetwork.org/
- **Walk and Bike to School**
  http://www.walkbiketoschool.org/

This page intentionally left blank.





3. ENFORCEMENT

Consistent enforcement of traffic laws is an important tool local jurisdictions can use to improve bicyclist and pedestrian safety and reduce the risk of severe and fatal collisions. Enforcement activities target behaviors that impact bicyclist and pedestrian safety, such as speeding, driver impairment, and distraction. They can take on a variety of forms, such as enforcement of traffic violations, safety patrols on major arterial streets, radar speed signs, and more. Implementing enforcement activities helps to increase awareness and reduce the frequency of traffic safety problems.

Effective bicycle and pedestrian safety enforcement activities often include collaboration and coordination with multiple departments within local jurisdictions. The U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) developed guides on how to enforce both bicycle safety and pedestrian safety. In the guides, the NHTSA found that effective bicycle and pedestrian safety enforcement activities tend to include some of the following components:

- Collaboration with partners in local businesses, civic organizations, and government agencies.
- Collaboration and coordination between the judiciary branch and city officials on planned traffic safety operations.
- Coordination with city engineers to ensure locations selected for traffic safety operations are suitable.
- Police officer trainings on local laws pertaining to crosswalks, pedestrians, and bicyclists, as well as training on safety program goals, objectives, and procedures.
- Incorporating bicycle and pedestrian safety operations into routine enforcement activities.

This section provides some benefits of pedestrian enforcement activities and some examples implemented in various cities both locally and nationally.

BENEFITS

Some of the benefits of implementing enforcement activities include:

- Increasing compliance with traffic safety laws.
- Improving driver, bicyclist, and pedestrian behavior.
- Reinforcing the importance of traffic codes to drivers, bicyclists, and pedestrians.
- Reducing collisions, injuries, and fatalities.
- Improving safety.
- Improving the relationship between the pedestrian/bicycling community and law enforcement.

EXAMPLES

ORANGE COUNTY SHERIFF'S DEPARTMENT BIKE AND PEDESTRIAN SAFETY ENFORCEMENT OPERATION PROGRAM

The Orange County Sheriff's Department periodically conducts bike and pedestrian safety enforcement operations which focus enforcement on collision factors involving motorists, pedestrians, and bicyclists. The Orange County's Sheriff's Department deploys extra officers to patrol locations where frequent pedestrian and bike collisions have occurred over the last three years. Patrolling officers pay special attention to drivers who speed, make illegal turns, fail to stop for stop signs and signals, fail to yield to pedestrians in crosswalks, and any other dangerous violations. Enforcement of traffic laws is not restricted to motorists. The program also enforces violations committed by pedestrians, such as crossing the street illegally or failing to yield to drivers who have the right-of-way. Funding for the bike and pedestrian safety enforcement operation program is provided by a grant from the California Office of Traffic Safety through the NHTSA.

CITY OF HUNTINGTON BEACH TICKET DIVERSION PROGRAM

The City of Huntington Beach re-launched its ticket diversion program in 2016, which provides an option for bicyclists and pedestrians to take a safety class in-lieu of paying a fine for traffic violations, authorized under the State of California's Assembly Bill 902 signed in September 2015. The safety class is a two hour class offered once a month and covers traffic laws and safety for active modes of transportation, such as walking, biking, and skateboarding. Traffic law offenders can be penalized with a fine up to $254 in the City of Huntington Beach. The cost of the class is $50, leading to a potential savings of $200 when traffic law offenders choose the traffic safety class option.

The ticket diversion program effectively encourages and promotes active transportation and safety within the city through a number of ways. First, the fines discourage violations of traffic law and second, it increases the number of people who voluntarily obtain education on traffic and safety laws for active modes of transportation.

The operation of the safety classes include cooperation from the police department and the City. To save costs, the safety classes are held at the City Council Chambers and are taught by two officers from the Huntington Beach Police Department. The classes include a presentation and videos discussing local and state laws. Additionally, costs are offset by the $50 class fee from adult participation and $15 from youth participation.

In Torrance, The South Bay Bicycling Coalition piloted a similar program along with the Redondo Beach Police Department and the traffic division of the Torrance Superior Court. Anyone who is cited in a city that cites to traffic court at the Torrance Superior Court can take the class and consequently get the citation erased from their record. The three hour safety class is taught by the South Bay Bicycling Coalition and covers the causes of bicycle crashes, rules of the road, safe-riding practices.

CITY OF SAN FRANCISCO PEDESTRIAN SAFETY ENFORCEMENT OPERATIONS

The San Francisco Police Department periodically conducts traffic safety enforcement operations that target bicycle and pedestrian safety. The operations deploy additional officers at locations where high numbers of pedestrian and bicycle collisions have occurred in the last three years. Under the program, special attention is directed towards the “Focus on the Five” traffic violations, which include: speeding, making illegal turns, failing to stop for stop signs and red lights, failing to yield to pedestrians in cross walks, as well as any other dangerous traffic violations.

The San Francisco Police Department periodically conducts three types of pedestrian safety operations to enforce traffic laws. These three types include:

- **Pedestrian Decoys:** Operations that target motorists who fail to yield to pedestrians in crosswalks. Decoy operations can involve one or more decoy officers and four to six citing officers.
- **LIDAR Speed Enforcement:** Operations that target motorists who travel at unsafe speeds through pedestrian zones. LIDAR speed enforcement operations can involve up to six officers.
- **Saturation Patrol:** Operations that target traffic violations and collision factors related to distracted driving. Saturation patrol operations can involve up to eight or more officers.

Locations for these operations are based on both complaints and frequency of incident occurrence.

ORLANDO BEST FOOT FORWARD FOR PEDESTRIAN SAFETY

Best Foot Forward is a pedestrian safety initiative launched in 2012 in Central Florida. It was formed to reduce pedestrian fatalities and injuries in the Orlando-Kissimmee-Sanford metropolitan statistical area (MSA) by 50% over a span of five years. The best foot forward coalition includes a variety of stakeholders, such as MetroPlan Orlando, Orange County Government, the City of Orlando, Orange County Public Schools, Orlando Health, the Florida Department of Transportation, LYNX, Winter Park Health Foundation, Orange Cycle, University of Miami’s Walk/Safe, Healthy Central Florida, as well as police officers throughout Orange County.

The initiative began in 2012 targeting the enforcement of traffic violations at non-signalized, marked crosswalks on streets with posted speed limits of 35 mph or less. The operation included two weeks of enforcement and six weeks of data collection to measure the results. The initiative also provides training to law enforcement officers and helps to subsidize overtime costs through a 50/50 funding match.

ADDITIONAL LAW ENFORCEMENT STRATEGIES

General strategies that can help enforce good vehicle, bicycle, and pedestrian behavior as well as bridge the gap between law enforcement and users of active transportation include officer participation on a Bicycle

Advisory Committee, the implementation of Bicycle Patrol Units, and Speed Radar Trailers.

- **Officer Participation on Bicycle Advisory Committee:** The League of American Bicyclists suggests that law enforcement officials take on a role in a Bicycle Advisory Committee. Bicycle Advisory Committees help address local bicycling needs and decisions regarding bicycling in their specific communities. This type of participation increases awareness of bicyclist concerns as well as the role that law enforcement has in creating an environment where bicyclists feel welcome but are also practicing safe behavior while bicycling.
- **Bicycle Patrol Units:** The League of American Bicyclists supports the strategy of having more police officers on bikes to help increase understanding of cyclists' issues. Bike patrol officers should undergo specialized training in bicycle-related traffic laws and safety techniques. Additionally, other bicyclists are typically more accepting of bike patrol officers as they can connect with bicyclists on a different level than vehicle patrol officers in a non-confrontational manner. Bike patrol officers can also more easily move about and enforce areas that are not easily vehicle accessible, such as near clusters of buildings at college campuses, office parks, shopping centers, or at events such as street fairs and other public gatherings. As a bonus, bicycles cost less to purchase and maintain than traditional patrol cars.
- **Speed Radar Trailer:** Speed radar trailers are electronic roadside signs mounted on an unmanned trailer that tell drivers how fast their vehicle is moving and can flash when they are going too fast, along with a speed limit sign. This is especially helpful near schools, crosswalks, or bicycle/multi-use paths where there are more likely to be bicyclists and pedestrians, or areas where there are speeding problems. Although more of a short-term strategy, speed radar trailers can be effective in signaling to vehicles to be more aware of those who are traveling without a car.

ADDITIONAL INFORMATION

- **Best Foot Forward Grassroots Pedestrian Safety Initiative**
  http://www.iyield4peds.org/
- **Huntington Beach Ticket Diversion Program**
  http://gohumansocal.org/Documents/Tools/CaseStudy_HuntingtonBeach.pdf
- **League of American Bicyclists, Bicycle Friendly America Program**
  http://www.bikeleague.org/bfa
- **NHTSA, Pedestrian Safety Enforcement Operations: A How-To Guide, 2014**
  https://www.nhtsa.gov/staticfiles/nti/pdf/812059-PedestrianSafetyEnforceOperaHowToGuide.pdf
- **Pedestrian and Bicycle Information Center, The Role of Law Enforcement in Pedestrian and Bicycle Safety Programs,**
  http://www.pedbikeinfo.org/programs/enforcement.cfm
- **South Bay Bicycle Coalition, Bicycle Safety Class**
  http://www.southbaybicyclecoalition.org/bicyclesafetyclass/

4. EVALUATION

Evaluating bicycle and pedestrian planning strategies is an important tool for local jurisdictions to use to determine whether an approach is successful in improving bicycle and pedestrian conditions and safety. It involves applying appropriate performance metrics to measure the effectiveness of a strategy in meeting project and community goals. Applying performance metrics can also help local jurisdictions customize and adopt appropriate strategies that require complex design solutions specific to a given community.

BENEFITS

Evaluating active transportation planning policies, strategies, and projects with appropriate performance metrics provides a number of benefits to local jurisdictions. Some of these benefits include:

- Measuring project success in meeting community goals.
- Helping local jurisdictions prioritize projects.
- Demonstrating value and benefits of projects to community members.
- Inform smarter data-driven infrastructure investments and decisions.
- Tracking project progress over a period of time.
- Capturing datasets for other related projects.

EXAMPLES

The type of performance metrics used will vary based on the nature of the project, goals, and data available. This toolkit provides some examples of performance metrics that can be used to measure pedestrian safety, infrastructure/network quality, and access to destinations as summarized in **Table 5-1**.

Table 5-1: Sample Evaluation Metrics

PERFORMANCE CATEGORY	PERFORMANCE METRIC
SAFETY	Bicycle/Pedestrian Counts and Trends
	Bicycle/Pedestrian Injuries and Fatalities
	Traffic Speed (85th Percentile Speeds)
INFRASTRUCTURE / NETWORK QUALITY	Level of Traffic Stress
	Bicycle/Pedestrian Level of Service (PLOS)
	Presence of Bicycle/Pedestrian Facilities
	Distance between Marked Crosswalks
	Connectivity/Gap Closures
ACCESS TO DESTINATIONS	Proximity to Transit (First/Last Mile)
	Trails Connection

METRICS TO MEASURE SAFETY

Performance metrics to measure safety provide information on the well-being of active transportation users on a given network. They can also provide information on the public health of a community. Some common performance metrics used to measure bicyclist and pedestrian safety include:

- **Bicycle/Pedestrian Counts and Trends:** Conducting bicycle and pedestrian counts provides information on infrastructure usage levels. It provides information on whether bicycle and pedestrian activity is increasing or decreasing over a period of time. Low levels of bicycle and pedestrian activity can be an indicator of infrastructure and safety issues. Several resources are available describing best practices in data collection for bike and pedestrian counts. Some of these resources include guidance and best practice strategies from FHWA, SCAG, Metro, and the National Bicycle and Pedestrian Documentation Project.
- **Bicyclist/Pedestrian Injuries and Fatalities:** Analyzing bicyclist and pedestrian injuries and fatalities can provide detailed information on how safe a street or intersection is for pedestrians. It can provide insight to collision patterns in the time of day, type of accident, cause of the accident, and location. A common resource for collision data is the California Highway Patrol's (CHP) Statewide Integrated Traffic Records System (SWITRS), which provides collision data for a variety of modes as well as data on injury severity. Additionally, another useful resource is UC Berkeley's Transportation Injury Mapping System (TIMS), which organizes SWITRS data into an easy to use web-based data query and mapping application that can be integrated seamlessly with Google Maps and ArcGIS.
- **Traffic Speed (85th Percentile Speed):** Analyzing traffic speeds can provide information on a roadway's propensity for bicycle and pedestrian collisions and level of injury severity. Increases in frequency and injury severity are often found in collisions with vehicles traveling at higher speeds. The National Center for SRTS reports that crashes at speeds of 30 mph are approximately eight times more likely to kill a pedestrian than crashes at speeds of 20 mph. Obtaining data on 85th percentile speeds provides information on the average speed that 85% of vehicles do not exceed along a given corridor. Analyzing

trends in traffic speeds can also provide information on whether infrastructure design solutions have improved the safety of a corridor and reduced collision risk and potential levels of injury severity.

METRICS TO MEASURE INFRASTRUCTURE/NETWORK QUALITY

Performance metrics to measure bicycle and pedestrian infrastructure/network quality provide information on elements that impact the quality and attractiveness of the bicycle and pedestrian environment. Simply providing active transportation infrastructure does not always increase bicycle and pedestrian activity within a community. Higher quality pedestrian infrastructure, which enhances the attractiveness of biking and walking, considers elements such as bike buffers, pedestrian buffers, street trees, sidewalk widths and accessibility, safety, connectivity, distances to crosswalks, and others. Some common performance metrics used to measure bicycle and pedestrian infrastructure/network quality include:

- **Level of Traffic Stress:** The Mineta Transportation Institute developed a methodology for measuring low-stress connectivity to evaluate and guide bicycle network planning. The methodology utilizes a classification system of roadways to determine their level of traffic stress. This same methodology can be applied to the pedestrian network planning. Level of traffic stress can be used to measure the qualitative aspects of bicycle and pedestrian facilities and sidewalks by considering factors such as number of travel lanes on the roadway, traffic volumes, posted speed limits, presence/absence of bike and pedestrian buffers (street trees, on-street parking, street furniture, etc.), and others. This metric provides information on the anticipated comfort level a bicyclist or pedestrian would have biking or walking along a given corridor.
- **Bicycle/Pedestrian Level of Service (BLOS/PLOS):** BLOS/PLOS is another performance metric for measuring quality of service of a bicycle or pedestrian facility. It incorporates measures for comfort, safety, and ease of mobility. The 2010 Highway Capacity Manual (HCM 2010) includes methodologies for calculating BLOS and PLOS and includes a variety of elements in its calculation, such as traffic volumes, speed, signalized intersections, pavement conditions, and others.
- **Presence of Bicycle/Pedestrian Facilities:** Presence of bicycle and pedestrian facilities, such as bike paths of varying class types, sidewalks, crosswalks, curb ramps, and others, provide information on the presence of the infrastructure needed to facilitate bicycle and pedestrian activity. Walk audits containing checklists for these types of infrastructure items are a helpful tool to inventory and evaluate the quality of bicycle and pedestrian facilities. Organizations such as the Pedestrian and Bicycle Information Center and the American Association of Retired Persons (AARP) provide sample walk audit checklists on their websites available for use.
- **Distance Between Marked Crossings:** Marked crosswalks help facilitate safe crossings for pedestrians by improving visibility and signifying the presence of pedestrians to drivers. Longer distances between marked crossings tend to deter pedestrian activity since it increases the time it takes for a pedestrian to get from point A to point B. Distance between marked crossings can provide information on whether the roadway is providing adequate opportunities for safe pedestrian crossings.
- **Connectivity/Gap Closure:** Connectivity and gap closure can help provide information on the accessibility of a bicycle or pedestrian facility. Sidewalks with missing gaps can impede pedestrian activity for those with disabilities and can also deter those without disabilities from walking along a corridor. Similarly, bikeways with missing gaps can deter bicyclists from choosing to bike to their destination if the gap makes them feel unsafe.

METRICS TO MEASURE ACCESS TO DESTINATIONS

Biking and walking often times serves as one component of a larger multi-modal trip, thus connectivity to other infrastructure, such as transit stops, multi-purpose trails, and bikeways, greatly enhances a person's ability to access goods, services, jobs, and recreation. Some common performance metrics used to measure bicycle and pedestrian access to destinations include:

- **Proximity to Transit (First/Last Mile):** Proximity to transit provides information on a bicyclist or pedestrian's ability to get from point A to point B. Bike and pedestrian facilities that are in close proximity to transit can help improve a community's access to goods, services, jobs, and key destinations.
- **Bikeways/Trails Connection:** Pedestrian connections to existing bikeways and recreational multi-use trails can encourage more pedestrian activity and provide access to recreational destinations such as parks and open spaces.

ADDITIONAL INFORMATION

The following resources provide additional information on the evaluation of pedestrian planning projects and performance metrics.

- **AARP, Walk Audit Tool Kit, 2016**
  https://www.aarp.org/content/dam/aarp/livable-communities/documents-2016/Walk-Audit-Tool-Kit/AARP-Walk-Audit-Tool-Kit-100416.pdf
- **Caltrans, Toward an Active California State Bicycle + Pedestrian Plan Performance Measures Technical Report, 2017**
  http://www.dot.ca.gov/activecalifornia/documents/PlanElements/Final_ActiveCA_PerformanceMeasures.pdf
- **CHP SWITRS**
  http://iswitrs.chp.ca.gov/Reports/jsp/CollisionReports.jsp
- **Fehr and Peers, Active Transportation Performance Measures, 2015**
  http://www.fehrandpeers.com/active-transportation-performance-measures/
- **FHWA, Exploring Pedestrian Counting Procedures: A Review and Compilation of Existing Procedures, Good Practices, and Recommendations, 2016**
  https://www.fhwa.dot.gov/policyinformation/travel_monitoring/pubs/hpl16026/hpl16026.pdf
- **FHWA, Guidebook for Developing Pedestrian and Bicycle Performance Measures, 2016**
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/pm_guidebook.pdf
- **Mineta Transportation Institute, Low-Stress Bicycling and Network Connectivity, 2012**
  http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf
- **National Bicycle and Pedestrian Documentation Project**
  www.bikepeddocumentation.org
- **Pedestrian and Bicycle Information Center Walkability Checklist**
  http://www.pedbikeinfo.org/pdf/community_walkability_checklist.pdf
- **SCAG, Metro, Conducting Bicycle and Pedestrian Counts: A Manual for Jurisdictions in Los Angeles County and Beyond, 2013**
  http://media.metro.net/projects_studies/call_projects/images/metroscag_bikepedcounttrainingmanual.pdf
- **UC Berkeley Transportation Injury Mapping System**
  https://tims.berkeley.edu

5. ENGINEERING

Engineering design treatments can greatly impact the environment for active transportation, by creating safer, inviting, and more accessible conditions for bicyclist and pedestrian activity. A variety of engineering tools can be applied to transform a streetscape so it can better accommodate bicyclist pedestrian safety needs. Some of these tools focus on roadway design, while others focus on bicycle and pedestrian facilities and infrastructure. This section provides brief descriptions of the benefits of implementing engineering design treatments and the tools that are available.

BENEFITS

A variety of engineering design treatments can help promote active transportation and improve safety conditions. By improving conditions for bicyclists and pedestrians, streets become safer for all users including transit riders and motorists. Some of the benefits of implementing carefully designed engineering treatments include:

- Reducing vehicular travel speeds and volumes down to a safe level.
- Improving visibility of bicyclists and pedestrians.
- Improving comfort level for bicyclists and pedestrians.
- Providing safe opportunities for crossings.
- Improving access to destinations.

EXAMPLES

This toolkit provides some examples of engineering design treatments that can be used to improve the bicycle and pedestrian environment. Although this section provides guidance on bicycle/pedestrian and roadway facility design, it is important to remember that urban streets are extremely complex and any roadway treatment must be carefully evaluated and tailored to each specific situation. Sound engineering judgment should always be applied to any roadway modification project.

The engineering design treatments discussed in this section apply to both pedestrian and bicycle environments. **Table 5-1** outlines a list of the potential treatments, beginning with treatments that apply to both pedestrian and bicycle strategies, treatments that only apply to pedestrian strategies, and treatments that only apply to bicycle strategies. The table also indicates the page number where the specific treatment is explained in more detail.

It should be noted that some of the engineering design treatments specific to bicycles on this list (beginning with Shared-Use Paths) are taken from the Bicycle Facility Toolkit in OCTA's 2016 OC Foothills Bikeways Strategy. The document details a comprehensive outline of engineering design treatments that are suitable for Orange County and are incorporated directly into this toolkit.

Table 5-1: Design Treatment Table

ENGINEERING DESIGN TREATMENT	APPLICABILITY		PAGE
	PEDESTRIAN	BICYCLE	
Traffic Calming	•	•	25
Pedestrian Lighting	•	•	26
Access to Transit	•	•	27
Driveways	•	•	28
Integration of Automated/Connected Vehicles	•	•	29
Sidewalks	•		30
Pedestrian Buffers	•		31
Integration with Bikeways	•		32
Pedestrian Intersection Treatments	•		32
Crossing Treatments	•		33
Pedestrian Signage	•		35
Senior Mobility	•		35
Bikeway Facility Types		•	36
Protected Intersections		•	37
Shared-Use Paths		•	41
Path Roadway Crossings		•	47
Separated Bikeways Design		•	51
Separated Bikeways at Intersections		•	62
Signalization		•	72
Shared Roadways		•	76
Bikeway Signing		•	79
Retrofitting Existing Streets to Accommodate Bikeways		•	82
Bicycle Support Facilities		•	85
Bikeways Maintenance		•	91

TRAFFIC CALMING

DESCRIPTION

Traffic calming measures help reduce vehicular volumes and speed down to a safe level for pedestrians and bicyclists. They include a variety of physical roadway measures that are designed to help improve safety and reduce conflicts between motorists, bicyclists, and pedestrians. It should be noted that the OCTA MPAH strictly prohibits the usage of volume control measures on MPAH streets. Local jurisdictions can, however, implement volume control measures on non-MPAH streets.

GUIDANCE/TOOLS

- **Speed Control – Horizontal Measures**
  - **Traffic Circles:** Traffic circles are raised circular islands constructed in the center of residential or local street intersections. They force a motorists to slow down in order to maneuver around them and may vary in design and materials used. The primary benefit of traffic circles is that they reduce the number of angle and turning collisions.
  - **Chicanes:** Chicanes are a series of curb extensions or road narrowings that are placed to form S-shaped curves along a segment of a roadway. Chicanes require motorists to slow down to a speed that allows them to maneuver around them. They should be placed at mid-block locations only and are the most effective on roadways where traffic volumes are equivalent on both approaches.
  - **Lateral Shifts:** Lateral shifts are a variation of a chicane, however only involves a single shift in the roadways rather than multiple shifts. Typical lateral shifts include a median island to prevent motorists from crossing the centerline and driving a straight path. Lateral shifts are applicable only at mid-block locations.
  - **Realigned Intersections:** Realigned intersections involve the reconfiguration of a T-intersection. They skew the approaches or travel paths through the intersection into curving streets and reduce vehicular speeds by limiting the ability for a motorist to drive through the intersection in a straight path.
- **Speed Control – Vertical Measures**
  - **Speed Humps:** Speed humps are rounded, raised areas placed across the roadway. They are generally 10 to 14 feet long (in the direction of travel) and are 3 to 4 inches high. The profile of a speed hump can be circular, parabolic, or sinusoidal. They are often tapered as they reach the curb on each end to allow unimpeded drainage.
  - **Speed Cushions:** A speed cushion is type of speed hump that allows larger vehicles, especially fire trucks, to straddle them without slowing down. Several small speed cushions are installed in a series across a roadway with spaces in between them.
  - **Speed Tables:** These are flat-topped speed humps often constructed with brick or other textured materials on the flat section. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat section. Good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles. Their long flat fields give speed tables higher design speeds than speed humps.
  - Raised Intersections: A raised intersection is essentially a speed table for an entire intersection. Construction involves providing ramps on each intersection approach and elevating the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, or pavers. The crosswalks on each approach are also elevated as a part of the

treatment, to enable pedestrians to cross the road at the same level as the sidewalk. This is good for mobility impaired pedestrians but may cause problems for the sight impaired if they cannot detect the curb edge.

- Volume Control Measures
  - **Full Closure:** These are barriers placed across a street to completed close the street to through-traffic, usually leaving only sidewalks open. They are good for locations with extreme traffic volume problems and several other measures have been unsuccessful.
  - **Half Closures:** These are barriers that block travel in one direction for a short distance on otherwise two-way streets. They are good for locations with extreme traffic volume problems and nonrestrictive measures have been unsuccessful.
  - **Diverters:** These are islands located along the centerline of a street and continuing through an intersection so as to block though-movement at cross streets. They are effective at inhibiting though traffic from main streets to local streets and unsafe left turns from local streets to main streets. These diverters are often used to allow bikes and pedestrians to go through but not allow vehicles.
  - **Diagonal Diverter:** Diagonal diverters are barriers placed diagonally across an intersection, blocking through movements and creating two separate, L-shaped streets. Like half closures, diagonal diverters are often staggered to create circuitous routes through the neighborhood as a whole, discouraging non-local traffic while maintaining access for local residents.
  - **Median Barriers/Forced Turn Islands:** Median barriers or forced turn islands are raised islands designed to restrict certain turning movements at an intersection approach. They are typically implemented to eliminate undesirable turning movements that facilitate neighborhood cut through traffic. In addition to reducing volumes, forced turn islands can also help improve safety by eliminating vehicular conflict points.eliminating vehicular conflict points.

PEDESTRIAN LIGHTING

DESCRIPTION

Street lighting is an important countermeasure in bicycle and pedestrian safety. Insufficient lighting along a corridor and at crosswalks impedes a driver's ability to detect bikes or crossing pedestrians, which can cause more frequent and severe collisions. Providing bicycle and pedestrian lighting along corridors and at crosswalks helps to improve safety by increasing bicyclist and pedestrian visibility to motorists and improving the reaction time to their presence. Lighting also helps to improve personal security for a bicyclist or pedestrian that is traveling along a corridor, waiting at a bus stop, or crossing the street. It encourages more biking and walking at night, improves access to transit, and can activate a corridor.

GUIDANCE/TOOLS

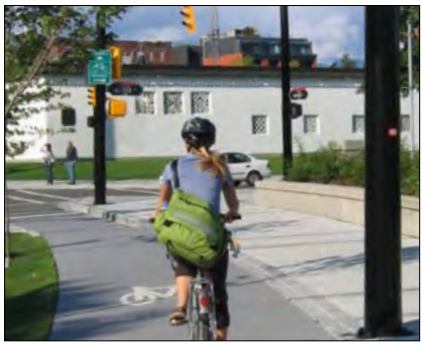
- **Crosswalk Lighting**
  - Crosswalk lighting should be provided at signalized, unsignalized, and mid-block crossings, especially at:
    - Locations with a speed limit of 40 mph or greater.
    - Intersections, access points, and decision points where the roadway alignment changes.

  - o Connections to transit.
  - o Locations that attract high bicycle and pedestrian volumes, such as schools, parks, community centers, and parking lots.
  - o Pedestrian refuge islands.
- Crosswalk lighting should be installed at least 10 feet ahead of the crosswalk rather than directly overhead to increase contrast, enhance visibility, and facilitate facial communication between the bicyclist/pedestrian and the motorist.

- **Corridor Lighting**
  - Corridor lighting should be used to illuminate sidewalks and bikeways and should be installed on both sides of the street.
  - Corridor lighting should use uniform lighting levels.
  - Regular maintenance should include replacing bulbs as they approach the end of their life cycle in order to maintain proper lighting.
  - Street trees and landscaping features should be regularly pruned to ensure uniform lighting along the street and sidewalk.

ACCESS TO TRANSIT

DESCRIPTION



Because every transit rider begins and ends a transit trip by walking, the bicycle and pedestrian environment plays a critical role in attracting new riders and maintaining existing levels of ridership. The presence of high-quality infrastructure and amenities for active transportation near transit greatly enhances a person's ability to access transit services. Improving access to transit includes a wide range of strategies, such as the provision of connected and wide sidewalks, level boarding features, shelters, benches, street lighting, street trees, wayfinding, and more. The benefits of providing high-quality infrastructure and amenities for active transportation are also experienced by other modes of transportation. By providing high-quality infrastructure for active transportation, overall safety and comfort on city streets are improved to support all multi-modal connections to transit.

GUIDANCE/TOOLS

- **Sidewalks**
  - Sidewalks should be present within a quarter mile to half mile of transit stops, especially along High Quality Transit Areas (HQTA).
  - The NACTO Transit Street Design Guide recommends sidewalks should have clear pathway widths of 8 to 12 feet where transit is present.
  - Per the U.S. Access Board ADA Accessibility Guidelines, an absolute minimum clear pathway width of 3 feet is required for accessible routes at transportation facilities.
- **Bicycle Lanes**
  - Bicycle lanes should be present with one to two miles of transit stops, especially along High Quality

Transit Areas (HQTA).

- Where buses use a travel lane adjacent to a bicycle lane, both bus and bike operation comfort are enhanced by providing a buffer space between them when available. The NACTO Transit Street Design Guide recommends configuring the total width of these uses to a minimum of 15 feet total, with a desired minimum of 17 feet. Account for existing space constraints and operational characteristics on a case-by-case basis.
- Per the NACTO Transit Street Design Guide, shared bus-bike lanes may be 10-11 feet wide along segments where neither is expected to overtake the other, such as where bus volumes are moderate or where bus speeds are low. Passing at stops may be accommodated with a 13-foot shared lane.

- **Accessible Boarding Areas**
  - An accessible boarding area must be provided at all transit stops, which typically includes appropriate wheelchair waiting area widths, plus additional widths to position a wheel chair ramp.
  - Per the U.S. Access Board ADA Accessibility Guidelines, a wheelchair waiting area of 8 feet by 5 feet is required.
  - The U.S. Access Board ADA Accessibility Guidelines also requires that transit platform areas have cross slopes between 0.5% and 2% to achieve good drainage and accessibility. Landing areas should also have less than 1% cross slope.
- **Pedestrian Routes**
  - Pedestrian routes to transit should be direct and well-marked.
  - Marked crosswalks should be placed near transit stops to facilitate safe access to transit.
  - If a mid-block pedestrian crossing is provided, then it should be located behind a mid-block transit stop in order to enhance pedestrian visibility to oncoming vehicular traffic. Bus stops should be placed in front of a mid-block crosswalk by at least 5 feet, but 10 feet is preferred.
- **Lighting**
  - Transit stops should incorporate appropriate levels of lighting to enhance bicyclist/pedestrian visibility, security, and safety.
  - Transit stop lighting should be placed near passenger waiting areas, ticket-buying locations, and walkways. Street lights may not necessarily provide adequate amounts of lighting in all instances.
  - The American Public Transportation Association (APTA) recommends using multiple lights rather than single fitting to provide consistent levels of lighting and to reduce contrasts between shadow and light.
  - Avoid placing light fixtures at locations that can be blocked by street trees or other landscaping features.

DRIVEWAYS

DESCRIPTION

Various driveway designs may impede bicyclist and pedestrian access and safety. Some of these designs include overly wide and/or sloped driveways, driveways with large turning radii, multiple adjacent driveways, driveways that are not well defined, and driveways where the focus of a motorists is on finding a gap in congested traffic rather than the presence of bicyclists and pedestrians. Driveway design influences driver behavior and the safety of active transportation

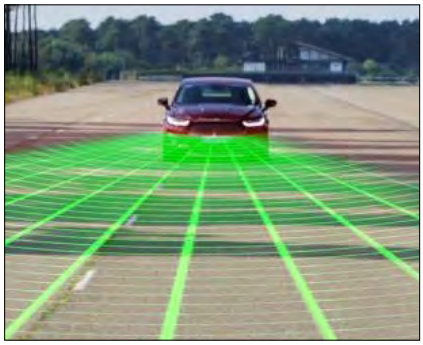
users. Careful attention to details such as the slope and design of the sidewalk intersecting the driveway as well as maintaining sight lines will help improve access and safety for bicyclists and pedestrians crossing driveways.

GUIDANCE/TOOLS

- **Turning Radii:** Some examples of driveway design improvements include narrowing driveways and tightening turning radii. Smaller driveway radii of 15 to 20 feet are recommended because they cause motorists to slow down in order to complete the turn.
- **Driveway Access:** Closing driveways or converting them to right-in-right out designs may help improve safety.
- **Sidewalks:** When sidewalks cross driveways, they should be continuous and clearly delineated across the driveway to signify the presence of bicyclists and pedestrians to motorists. Sidewalks must maintain a level with no more than 2% cross slope in order to safely accommodate wheelchair access and other mobility devices.
- **Sight Lines:** To improve visibility between motorists and active transportation users, large signs should be minimized and landscaping treatments should be properly maintained at driveways.

INTEGRATION WITH AUTOMATED/CONNECTED VEHICLES

DESCRIPTION



Emerging technologies in transportation have introduced the prospect of a widespread shift towards automated transportation. The race to implement fleets of automated/connected vehicles on city streets has begun and with it comes the impending need for proactive policy and regulation to not only guide automated/connected vehicle technology, but to also prioritize the needs of safety, equity, public health, and sustainability on city streets. The introduction of automated/connected vehicles presents a new set of challenges for designing the complete streets of tomorrow and how cities can ensure safety across all modes. Local jurisdictions must now begin to build upon the foundational principles of complete streets and Vision Zero to ensure policy, regulation, and infrastructure design catches up to the rapidly changing landscape of transportation technology.

GUIDANCE/TOOLS

- **Detection:** The detection technology implemented in automated/connected vehicles is a critical component for ensuring safety between interactions with pedestrians and bicyclists. They allow automated/connected vehicles to detect, recognize, and anticipate the movements of pedestrians and bicyclists. The same infrastructure conditions that impede a human driver's ability to detect pedestrians and bicyclists also present challenges for automated/connected vehicles. These infrastructure conditions include, low light or glare, road curvature, visually cluttered landscaping, on-street parking, and other impediments to sight lines. Local jurisdictions will need to consider policy and roadway design solutions that can provide contextual warnings and improve the detection of pedestrians and bicyclists.
- **V2X:** V2X is the terminology used to describe the wireless communication between connected vehicles, bicycles, pedestrians, infrastructure, and other road users. V2X as it relates to the bicycle/pedestrian environment represents the short-range wireless communications to inform connected vehicles of the

presence of bicyclists or pedestrians via personal beacon devices carried by bicyclists or pedestrians through their smartphone devices or other wireless communication devices. Initial research on V2X systems have theorized that they could potentially improve safety and efficiency for active transportation users by connecting to various roadway infrastructure to impact signal timing and prioritization for bicyclists and pedestrians.

- **Right-of-Way**
  - **Curbside Management:** Local jurisdictions should begin to consider curbside management strategies to reduce conflicts between transportation modes. These strategies can include separate pick-up/drop-off locations at transit stations/hubs or allowing curbs to serve different functions throughout the day, ranging from public space, pick-up/drop-off, deliveries, and other functions.
  - **Lane Widths:** Although, best practice strategies have identified lane widths of 10 feet as sufficient for accommodating vehicular traffic, many travel lanes in local jurisdictions are wider than 10 feet. As automated/connected transportation technology develops and advances, local jurisdictions will need to consider if large travel lane widths are still necessary and whether the additional right-of-way may be better suited to accommodate wider sidewalks for pedestrian travel or wider bicycle lanes for cyclists.
- **Speed:** Streets should be designed to prioritize the safety of all users. Local jurisdictions should work with auto manufacturers and transportation network companies (TNCs), such as Uber and Lyft, to ensure automated/connected vehicles are tested and programmed for safe and slow speeds when traveling in areas with high bicycle and pedestrian activity. Additionally, physical traffic calming treatments, such as traffic circles, speed humps, and others, as well as traffic signal timing can be incorporated to control travel speeds of automated/connected vehicles.

SIDEWALKS

DESCRIPTION

Sidewalks serve as the backbone to any pedestrian network and provides access to goods, services, jobs, and key destinations. In order to encourage more pedestrian activity in Orange County, sidewalks need to be safe, comfortable, well-maintained, attractive, and must be designed to accommodate mobility needs for all users regardless of age or ability. Sidewalks also present opportunities to transform streets into vibrant public spaces. Designed well, sidewalks can help activate corridors, create a sense of place, and encourage social activity.

GUIDANCE/TOOLS

- **Width:** Sidewalks should be designed to provide a minimum width of 5 feet in order to accommodate turning movements for wheelchair users and other mobility devices.
- **Location:** Sidewalks should be located on both sides of the street in all urban areas. They should also be located near major activity centers, transit stops, schools, parks and other high trip attractor locations.
- **Connectivity:**
  - The sidewalk network should be as complete as possible with minimal gaps or connectivity issues that would impede access for wheelchairs or other mobility devices.
  - Where the sidewalk network crosses multiple city boundaries, coordination efforts between cities should be made to ensure seamless connectivity.

- **Surface Conditions:** Sidewalks and the adjacent landscaping should be periodically monitored for conditions that may impact safety and impede access for wheelchairs or other mobility devices. This includes inspections for damage by tree roots, ground swelling, heat buckling, and other conditions impacting sidewalk surfaces.
- **Surface Materials:** Sidewalks should incorporate material that will not hinder the degree of access for wheelchairs or other mobility devices.
- **Clear Walkways:** Objects such as utility poles, light fixtures, and other street furniture should not restrict the width of the walkway. Walkway widths should be compliant with ADA accessibility guidelines.
- **Qualitative Design:** Sidewalk design should consider components such as lighting, shade, landscaping, and pedestrian buffers that can improve comfort level and the quality of the network.

PEDESTRIAN BUFFERS

DESCRIPTION

Incorporating appropriate pedestrian buffers from vehicular traffic enhances the quality of the overall pedestrian environment. Buffers are especially instrumental in improving pedestrian comfort levels along high volume and high speed roadways by making pedestrians feel less exposed and by providing an additional sense of protection against vehicular traffic. Buffer treatments typically include street trees, landscaping features, street furniture, on-street parking, and bikeway facilities. They are placed between vehicular travel lanes and the pedestrian walkway either on the roadway or on the sidewalk.

GUIDANCE/TOOLS

- **Street Trees/Landscaping:**
  - Street trees and landscaping features help enhance the aesthetics and quality of a corridor. They provide shade for comfort during warmer months and can divert stormwater from sidewalk surfaces to the soil.
  - Street trees and landscaping feature should be periodically monitored so they do not impede on safety or access by wheelchairs or other mobility devices. Periodic maintenance and inspections are required to ensure pathways and sight lines along sidewalks are unobstructed by street trees and other landscaping features.
- **Street Furniture:**
  - Street furniture includes elements such as parking meters, utility poles/boxes, signs, bus shelters/benches, bike racks, public art, and trash receptacles. Placement of street furniture should not impede or restrict access by wheelchairs or other mobility devices.
  - Benches should be provided along busy transit corridors, in areas of high pedestrian volume, and along blocks with a steep grade to serve as a place for rest for seniors, wheelchair users, and other others.
- **On-Street Parking:**
  - On-street parking can cause visual barriers between drivers and crossing pedestrians. Placement of on-street parking should not obstruct driver sight lines nearing crossings and intersections.
  - The FHWA does not recommend diagonal parking on high speed or high volume roadways.

  - Back-in diagonal parking provides advantages over pull-in parking, such as providing trunk access from the curb rather than the street, providing drivers direct open door access to the sidewalk, and providing drivers clear sight lines when leaving the space.

- **Bikeways**
  - Incorporating on-street bikeway facilities, such as Class II and Class IV bikeways, not only provides a pedestrian buffer, but also encourages bicyclists not to ride on sidewalks and consequently reduces conflicts with pedestrians.

INTEGRATION WITH BIKEWAYS

DESCRIPTION

Bikeway facilities help to improve the pedestrian environment in a number of ways, such as encouraging lower vehicular speeds and providing a buffer between pedestrians and vehicular traffic. Despite these benefits, conflicts between bicyclists and pedestrians can arise in locations where their paths intersect, such at intersections, crosswalks, and transit stops. To reduce conflicts, design considerations should be given to safely integrate the pedestrian environment with bikeway facilities at locations where their paths intersect.

GUIDANCE/TOOLS

- To improve pedestrian visibility, marked crosswalks should be extended across on-street bicycle facilities, to communicate to bicyclists that they must yield to pedestrians. Additionally, appropriate signage should be place in advance of a crosswalk to alert bicyclists of the presence of pedestrian crossings.
- For shared off-street facilities, such as multi-use paths, pedestrians should be encouraged to stay to the right. When possible, markings or signage should be used to indicate to pedestrians to stay to the right to avoid conflicts with bicyclists.

INTERSECTION TREATMENTS

DESCRIPTION

Conflicts between pedestrians and pedestrians are often heightened at intersection crossings due to the merging of vehicular, bicycle, and pedestrian movements. Successful treatments for intersections should focus on improving the level of visibility and safety for all modes. This section explores a variety of treatments from curb extensions, refuge islands, raised intersections, signals, and others to ensure mobility and safety goals are addressed.

GUIDANCE/TOOLS

- **Curb Extensions:** Curb extensions create safer and shorter crossings for pedestrians by reducing the crossing distance for pedestrians, visually and physically narrowing the roadway, and reducing the

time pedestrians are in the street. Curb extensions provide visual cues to motorists to slow down due to the physical narrowing of the street. They also increase the visibility of pedestrians to motorists by positioning them in line with the parking lane. Curb extensions are best suited to locations with substantial pedestrian activity and where on-street parking is present.

- **Refuge Islands:** Refuge islands are raised islands that can be placed in the center of an intersection or mid-block crossing. They allow pedestrians to cross two-way streets one traffic direction at a time and they provide a protected space for pedestrians to stand and wait for an adequate gap in traffic before completing the second half of their crossing. Refuge islands are also beneficial for slower-paced pedestrians who may get caught in the middle of a roadway when the traffic signal changes prior to completing the crossing. Refuge islands are typically applied along streets where speeds and volumes make pedestrian crossings difficult or along streets with three or more traffic lanes. The FHWA recommends that refuge islands be at least 4 feet wide and be of adequate length to allow multiple pedestrians to stand and wait.
- **Raised Intersections:** A raised intersection is essentially a speed table for an entire intersection. Construction involves providing ramps on each intersection approach and elevating the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, or pavers. The crosswalks on each approach are also elevated as a part of the treatment, to enable pedestrians to cross the road at the same level as the sidewalk. This is good for mobility impaired pedestrians but may cause problems for the sight impaired if they cannot detect the curb edge.
- **Traffic Signals:** Traffic signals govern vehicular, bicycle, and pedestrian movement at intersections by allocating time and assigning right-of-way to conflicting traffic movements. Factors that should be considered to enhance pedestrian safety include:
  - Signal Prioritization: Signal priority tools, such as leading pedestrian intervals (LPI), synchronized signals for bicycles, or transit signal priority can be used to prioritize desired modes.
  - Signal Timing: Signals can be synchronized at or below targeted speeds to facilitate safe vehicular travel speeds.
- **Protected Intersections:** Protected intersections are an intersection design treatment that separates turning vehicles from crossing bicyclists and pedestrians with corner safety islands and setback bicycle crossings. The physical separation provides motorists with increased reaction times and visibility of pedestrians and bicyclists.
- **Painted Intersections:** Painted intersections typically involve a mural that is painted by the community directly onto the pavement of an intersection. They help slow down vehicular speeds by alerting them to the presence of an intersection. Painted intersections are also a tool for placemaking and enhancing a community's identity.

CROSSING TREATMENTS

DESCRIPTION

A well designed pedestrian network will enable a pedestrian to complete two important functions: walking along streets and crossing streets safely. Successful crossing treatments should consider the safety needs of all users, paying special attention to groups that are more vulnerable to collisions, such as children, the elderly, and those with disabilities. Every pedestrian crossing environment is different and crossing treatments should be carefully selected and designed to fit each individual setting.

GUIDANCE/TOOLS

- **Marked Crosswalks:** Marked crosswalks signify locations where pedestrians can cross the street and designate right-of-way for motorists to yield to pedestrians. They are often implemented at signalized locations and at locations with high levels of pedestrian and vehicular traffic. Crosswalks should be placed at signalized intersections, crossings near transit locations, trail crossings, school walking routes, and at locations that enable comfortable crossings for multi-lane roadways. Marked crosswalks are often used with additional measures to enhance safety and increase awareness of the presence of pedestrians. Marked crosswalks alone are not recommended under the following conditions:
  - Multi-lane roadways w/o a median and average daily traffic (ADT) > 12,000
  - Multi-lane roadways w/ a median and ADT > 15,000
- **High Visibility Crosswalks:** High visibility crosswalks incorporate ladder or zebra striped markings to draw more attention to the presence of pedestrians. These crosswalks are proven to be more visible to approaching vehicles and have been show to improving yielding behavior from motorists. They should be considered at locations with a history of conflicts between vehicular and pedestrian traffic and areas with high pedestrian volume.
- **Pedestrian Scrambles:** Pedestrian scrambles stop all vehicular traffic and allow pedestrians an exclusive interval to cross an intersection in all directions, including diagonally, at the same time. Pedestrian scrambles should be considered in locations where large numbers of pedestrians are expected and where there is enough space to accommodate large numbers of pedestrians to gather on the sidewalks.
- **Mid-block Crossings:** Mid-block crossings allow pedestrians to cross at locations other than intersections. They are typically considered when intersections are far apart and where there is strong evidence for pedestrian demand. An effective mid-block crossing encourages pedestrians to cross at the safest locations, makes them visible They should be located
- **Curb Ramps:** Curb ramps provide crucial access to sidewalks for people using wheelchairs and other mobility devices. As mandated by federal legislation, curb ramps must be installed at all intersections and mid-block locations where there are pedestrian crossings. Separate curb ramps for each crosswalk at an intersection should be provided to improve orientation for the visually impaired and to direct them towards the correct crosswalk. Truncated domes should also be installed as detectable warnings with curb ramps.
- **Pedestrian Signals:** Pedestrian signals indicate to pedestrians when it is permissible and safe to cross a street. They should be clearly visible at all times and must indicate to pedestrians when they can and can't cross. Newly installed traffic signals require countdown pedestrian indicators to indicate the amount of time left to cross. Pedestrian detectors, such as pushbuttons, are used to detect the presence of pedestrians that are in a position to cross.
- **Pedestrian Hybrid Beacons (formerly HAWK):** A pedestrian hybrid beacon facilitates pedestrian crossings at unsignalized locations with marked crosswalks by warning and controlling traffic. They are activated by pedestrian detectors, such as pushbuttons. Pedestrian hybrid beacons are recommended at uncontrolled crossings of multi-lane, higher speed and/or volume roadways where there is a need for pedestrian crossings without inordinate delay to vehicular traffic. They should be used in conjunction pedestrian countdown signals, crosswalks, and appropriate advance yield lines.
- **Rectangular Rapid Flash Beacons (RRFB):** RRFBs are devices that use LED flashing beacons to alert motorists of pedestrian crossings. They are activated by pedestrian detectors such as pushbuttons and are placed on both sides of the crosswalks. RRFBs should be used in conjunction with pedestrian crossing sign and supplemented with advance yield or stop pavement markings. They should not be used in conjunction with yield sign, stop sign, traffic control signal, nor should they be located at a roundabout. RRFBs are the most effective on two-lane streets, and less suited for multi-lane roadways.
- **Leading Pedestrian Interval (LPI):** LPIs provide pedestrians with a head start ranging from 3 to 7 seconds before motorists are allowed to proceed through the intersection. By providing pedestrians a

head start to cross, they help improve safety and visibility. LPIs can be programmed into traffic signals to help minimize conflicts between left or right turning vehicular traffic. A minimum head start of 3 to 7 seconds is recommended, however, intervals of 10 seconds may be appropriate in locations with long crossing distances. LPIs are recommended at locations where there are consistent conflicts between left turning or right turning vehicles and pedestrians.

SIGNAGE

DESCRIPTION

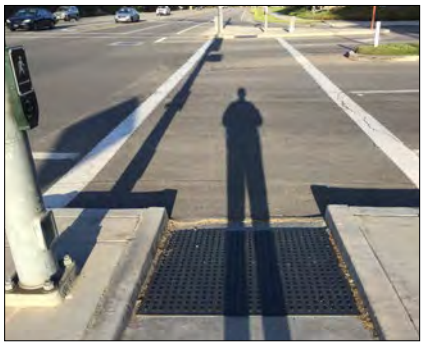
Signs are used to provide information to improve roadway safety and wayfinding. They provide information to roadway users regarding right-of-way, restricted turning movements, speed limits, and more. There are two types of signage that are useful in enhancing the pedestrian environment, regulatory and wayfinding signage. Regulatory signage is used to indicate or reinforce traffic laws and requirements of the roadway and are intended to enhance safety amongst all roadway users. Wayfinding signage is used to provide directional information to key destinations, highways, routes, and more. While signage on roadways should be used to communicate key information, careful consideration to their placement should be given to keep visual clutter at a minimum.

GUIDANCE/TOOLS

- **Advanced Yield/Stop Lines:** Advanced yield/stop lines signify to motorists where they must stop in compliance with a stop sign or signal, and are typically placed back from the crosswalk. Placing advanced yield/stop lines back from the crosswalk reduces vehicle encroachment into the crosswalk and improves visibility of pedestrians.
- **Wayfinding Signage:** Pedestrian-oriented wayfinding signage, such as maps and directional signs, help improve pedestrian circulation and enhance an area's sense of place. They help pedestrians navigate to nearby destinations, transit stops, and key routes. Local jurisdictions should consider uniformity in wayfinding signage design and theme to minimize visual clutter, develop a civic brand, and create a sense of place.

SENIOR MOBILITY

DESCRIPTION



The complexities of age-related changes make senior pedestrians more susceptible to collisions and severe injuries. These age-related changes include gradual declines in hearing, vision, balance, physical mobility and depth perception. Additionally, FHWA research found that the risk of suffering from a fatal pedestrian crash increases with age because older people are often less physically resilient. In order to improve safety and the pedestrian environment for seniors, roadway design and improvements must consider the unique and complex needs of older pedestrians. These design considerations include increasing street crossing times, audible tones at pedestrian signals, detectable warning surfaces, and more.

GUIDANCE/TOOLS

- **Pedestrian Signal Heads:** Increase street crossing times to accommodate slower walkers.
- **Refuge Islands:** Incorporate refuge islands at locations where vehicular speeds and volumes make pedestrian crossings difficult for slower walkers. They should be considered along streets with three or more traffic lanes.
- **ADA Compliance**
  - Ensure curb ramps are incorporated at pedestrian crossings to accommodate access for wheelchairs and other mobility devices.
  - Ensure sidewalks provide a minimum width of 5 feet in order to accommodate turning movements for wheelchair users and other mobility devices.
  - Ensure street furniture, street trees, and other landscaping features do not encroach upon the pedestrian pathway.
- **Treatments for Visually Impaired:** Pedestrians with visual impairments require additional navigational cues to enhance safety.
  - Detectable warning surfaces, such as truncated domes or detectable edges, should be implemented to distinguish boundary between a shared street and a conventional street.
  - Detectable warning surfaces should be consistent in materials and texture.
  - Audible tones that communicate information, such as when it is safe to cross, should be incorporated at pedestrian signals.

BIKEWAY FACILITY TYPES

DESCRIPTION

As streetscapes and infrastructure vary across regions and specific communities with varying land uses, a number of different types of bicycle facilities may be incorporated into the streetscape as appropriate. Choosing the appropriate type of facility will help to improve safety for active transportation users, manage traffic congestion, enhance economic development, and address matters of social equity.

GUIDANCE/TOOLS

The Caltrans Highway Design Manual classifies bicycle facilities into four classes of bikeways.

- **Class I Bikeways:** Also known as bike paths or shared-use paths, Class I Bikeways are facilities with exclusive right of way for bicyclists and pedestrians, away from the roadway and with minimized cross flows by vehicle traffic. These facilities support both recreational and commuting opportunities, especially along rivers, shorelines, canals, utility rights-of-way, railroad rights-of-way, within school campuses, or within and between parks. Detailed guidance for Class I Bikeway installation based on completed guidance included in the OC Foothills Bikeways Strategy can be found in Appendices A and B.
- **Class II Bikeways:** Also known as bike lanes, Class II Bikeways are established along streets, defined by pavement striping and signage to delineate a portion of a roadway for bicycle travel. Bike lanes are one-way facilities, typically striped adjacent to vehicle traffic traveling in the same direction. Buffered bike lanes provide greater separation from an adjacent traffic lane or on-street parking by using chevron

or diagonal markings. Buffered bike lanes may be desirable on streets with higher vehicle speeds or volumes. Detailed guidance for Class II Bikeway installation based on completed guidance included in the OC Foothills Bikeways Strategy can be found in Appendices C, D, and E.

- **Class III Bikeways:** Also known as bike routes, Class III Bikeways are designated routes shared with vehicles but not served by dedicated bikeways. Bike routes are established by placing signage and/or shared roadway (sharrow) markings along roadways, and are therefore generally not appropriate for roadways with high vehicle speeds or volumes. A Bicycle Boulevard is a type of bike route where bicycle travel is prioritized. These facilities are typically sites on mostly residential streets where biking or walking is the primary mode of transportation. Traffic speed and non-local vehicle access is reduced for the safety of bicyclists and pedestrians. Detailed guidance for Class III Bikeway installation based on completed guidance included in the OC Foothills Bikeways Strategy can be found in Appendices F and G.
- **Class IV Bikeways:** Also known as separated bikeways or cycle tracks, Class IV bikeways are for the exclusive use of bicycles and are physically separated from vehicle traffic with a vertical feature. The separation may include grade separation, flexible posts, inflexible barriers, or on-street parking.

PROTECTED INTERSECTIONS

DESCRIPTION

Separated bikeways at intersections can be designed as a protected intersection. These intersections provide greater separation and protection for bicyclists and minimize the number of conflict points with vehicle traffic. Protected intersection design is applicable at both signalized and stop-controlled intersections.

GUIDANCE/TOOLS

Protected intersections may require more space in the immediate vicinity of the intersection than intersections with conventional facilities. The space needed is determined by factors such as lane configuration, the presence of parking, and turning radius requirements. Key features of a protected intersection often include the following:

- **Corner Safety Island:** A corner safety island is a raised area that separates the separated bike lane from the general purpose travel lane and defines the corner radius of the intersection. The island provides comfort for waiting bicyclists and a place to queue when crossing or turning, and may manage the speed of turning vehicles when permitted turn conflicts are allowed. Turning speeds should be limited to 15 mph or less when permissive right turns across the path of through bicycles are allowed. There should be a minimum of 10 feet between the corner safety island and pedestrian sidewalk.
- **Corner Apron:** A corner apron is an optional traversable part of the corner safety island that may be needed to accommodate the wheel tracking of large vehicles. This feature helps to make geometry designed to slow driver turning speeds compatible with larger vehicles.
- **Forward Stop Bar:** The forward stop bar marks the location at which bicyclists are intended to stop and wait at a red signal indication. The location of this stop bar is purposefully further ahead of the vehicles traveling the same direction as to increase visibility of the bicyclist to the motorist.
- **Approach Taper:** The separated bike lane should shift in advance of the intersection to align bicyclists with the setback bicycle crossing. This taper should be subtle to minimize impacts to bicyclists. It is recommended to provide a taper of 1:10 (1:5 minimum).
- **Yield for Pedestrians:** Bicyclists should yield to crossing pedestrians at the location of the pedestrian

crosswalks prior to progressing to the forward stop bar waiting location. Yield line markings and signs should identify this requirement.

- **Pedestrian Safety Island:** The pedestrian safety island should be installed between the separated bike lane and general purpose travel lanes, allowing pedestrians to queue on a clearly detectable DON'T WALK signal and shorten crossing distance of the roadway. Per the MUTCD and AASHTO guidelines, the pedestrian island should be at least 4 feet wide and 6 feet long.
- **Setback Bicycle Crossing:** The bicycle and pedestrian crossings should be set back from that of the adjacent travel lanes, in line with the ends of the corner safety islands. This improves sight lines and clearly establishes priority.
- **Bicycle Signal Optimization:** Various signal phasing schemes may be used to mitigate or prevent conflict between bicyclists, pedestrians, and turning motor vehicles.

The following treatments specific to bicycles are taken from the Bicycle Facility Toolkit in OCTA's 2016 OC Foothills Bikeways Strategy, and are represented starting at page 41 of this document:

SHARED-USE PATHS

PATH ROADWAY CROSSINGS

SEPARATED BIKEWAY DESIGN

INTERSECTION TREATMENTS FOR SEPARATED BIKEWAYS

SIGNALIZATION

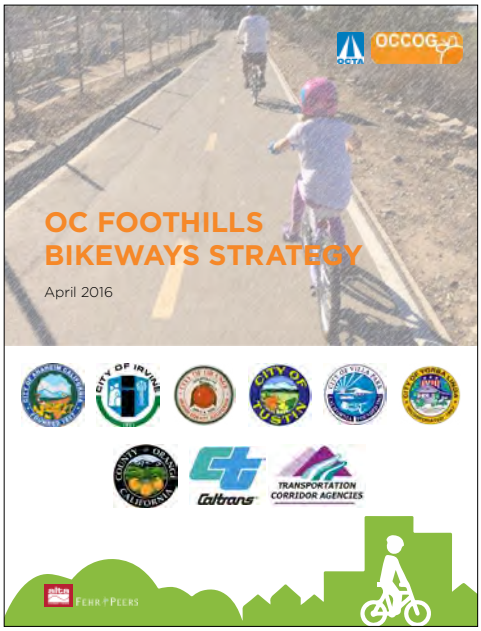
SHARED ROADWAYS

BIKEWAY SIGNING

RETROFITTING EXISTING STREETS TO ACCOMMODATE BIKEWAYS

BICYCLE SUPPORT FACILITIES

BIKEWAYS MAINTENANCE



ADDITIONAL INFORMATION

The following resources provide additional information on engineering treatments that can be used to promote and improve pedestrian activity and safety.

- **Alta Planning + Design, The Evolution of the Protected Intersection, 2015**
  https://altaplanning.com/wp-content/uploads/Evolution-of-the-Protected-Intersection_ALTA-2015.pdf
- **APTA, Bus Stop Design and Placement Security Considerations, 2010**
  http://www.apta.com/resources/standards/Documents/APTA-SS-SIS-RP-008-10.pdf
- **Caltrans, A Guide to Bikeway Classification, 2017**
  http://www.dot.ca.gov/d4/bikeplan/docs/caltrans-d4-bike-plan_bikeway-classification-brochure_072517.pdf

- **Caltrans, Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians, 2010**
  https://nacto.org/docs/usdg/complete_intersections_caltrans.pdf
- **City of Boston, Boston Complete Streets Guidelines, 2013**
  http://bostoncompletestreets.org/guidelines/
- **County of Los Angeles, Model Design Manual for Living Streets, 2011**
  http://www.modelstreetdesignmanual.com/
- **FHWA, Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities, 2017**
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/accessible_shared_streets/
- **FHWA, Achieving Multimodal Networks Applying Design Flexibility and Reducing Conflicts, 2016**
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/fhwahep16055.pdf
- **FHWA, Case Studies in Delivering Safe, Comfortable and Connected Pedestrian and Bicycle Networks, 2015**
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/network_report/
- **FHWA, Pedestrian Safety Guide and Countermeasure Selection System, 2013**
  http://www.pedbikesafe.org/PEDSAFE/index.cfm
- **FHWA, Traffic Calming ePrimer**
  https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3.cfm
- **NACTO, Urban Street Design Guide, 2013**
  https://nacto.org/publication/urban-street-design-guide/
- **NACTO, Blueprint for Autonomous Urbanism, 2017**
  https://nacto.org/publication/bau/blueprint-for-autonomous-urbanism/
- **NACTO, Transit Street Design Guide, 2016**
  https://nacto.org/publication/transit-street-design-guide/
- **OCCOG, Complete Streets Initiative Design Handbook, 2016**
  https://www.occog.com/occog-complete-streets/
- **OCTA, OC Foothills Bikeways Strategy, 2016**
  http://www.octa.net/pdf/20160404_OC%20Foothills%20Bikeways_Final%20Final.pdf
- **Pedestrian and Bicycle Information Center, Discussion Guide for Automated and Connected Vehicles, Pedestrians, and Bicyclists, 2017**
  http://pedbikeinfo.org/pdf/PBIC_AV.pdf
- **University of North Carolina (UNC) Highway Safety Research Center, Costs for Pedestrian and Bicyclist Infrastructure Improvements, 2013**
  http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf
- **U.S. Access Board, ADA Accessibility Guidelines, 2002**
  https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag
- **U.S. Department of Justice, ADA Standards for Accessible Design, 2010**
  https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf

This page intentionally left blank.

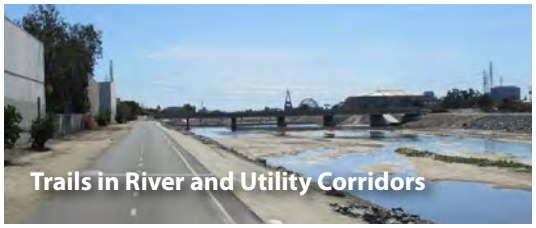
5.3 SHARED-USE PATHS

A shared use path allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Key features of shared use paths include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.


General Design Practices


Trails in River and Utility Corridors


Trails in Abandoned Rail Corridors


Trails in Existing Active Rail Corridors


Local Neighborhood Accessways

5.3.1 GENERAL DESIGN PRACTICES

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

Lateral Clearance

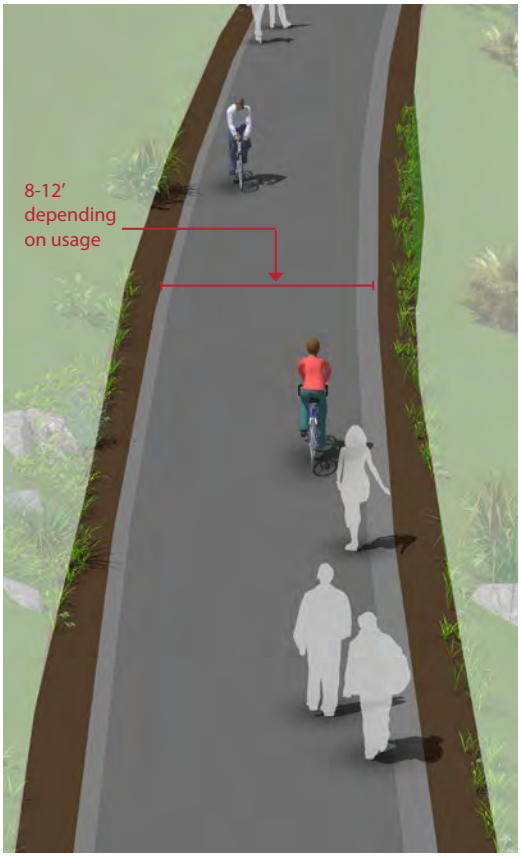
- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.
- If bollards are used at intersections and access points, they should be colored brightly and/or supplemented with reflective materials to be visible at night.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.



Discussion

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

5.3.2 PATHS IN RIVER AND UTILITY CORRIDORS

Description

Utility and waterway corridors often offer excellent shared use path development and bikeway gap closure opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.

Guidance

Shared use paths in utility corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

Access Points

Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

Path Closure

Public access to the shared use path may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

Discussion

Similar to railroads, public access to flood control channels or canals may be undesirable. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all may constitute risks for public access. Appropriate fencing may be desired to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

5.3.3 PATHS IN ABANDONED RAIL CORRIDORS

Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use.

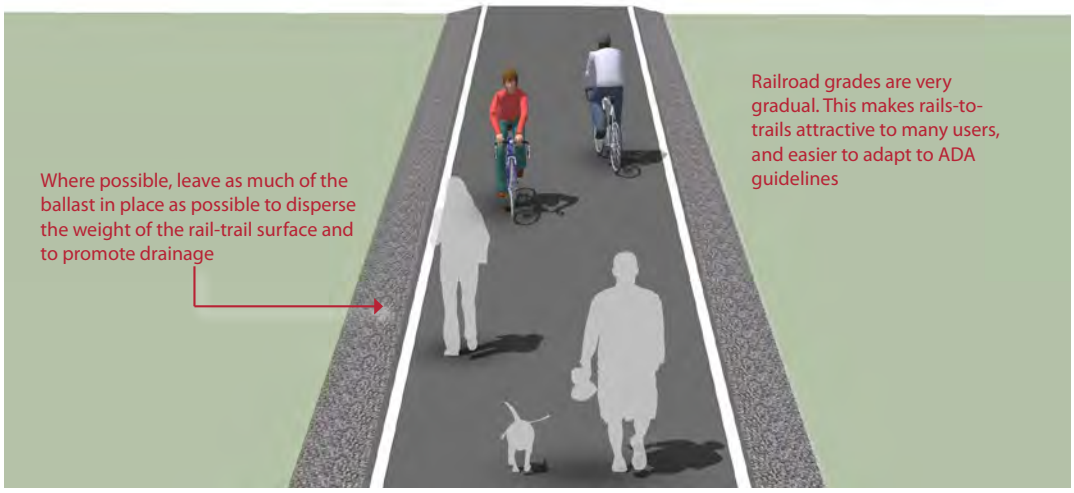
The railroad may form an agreement with any person, public or private, who would like to use the banked rail line as a trail or linear park until it is again needed for rail use. Municipalities should acquire abandoned rail rights-of-way whenever possible to preserve the opportunity for trail development.

Guidance

Shared use paths in abandoned rail corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.

If converting a rail bed adjacent to an active rail line, see Shared Use Paths in Active Rail Corridors.



Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

Rail-to-trails can involve many challenges including the acquisition of the right of way, cleanup and removal of toxic substances, and rehabilitation of tunnels, trestles and culverts. A structural engineer should evaluate existing railroad bridges for structural integrity to ensure they are capable of carrying the appropriate design loads.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

5.3.4 PATHS IN ACTIVE RAIL CORRIDORS

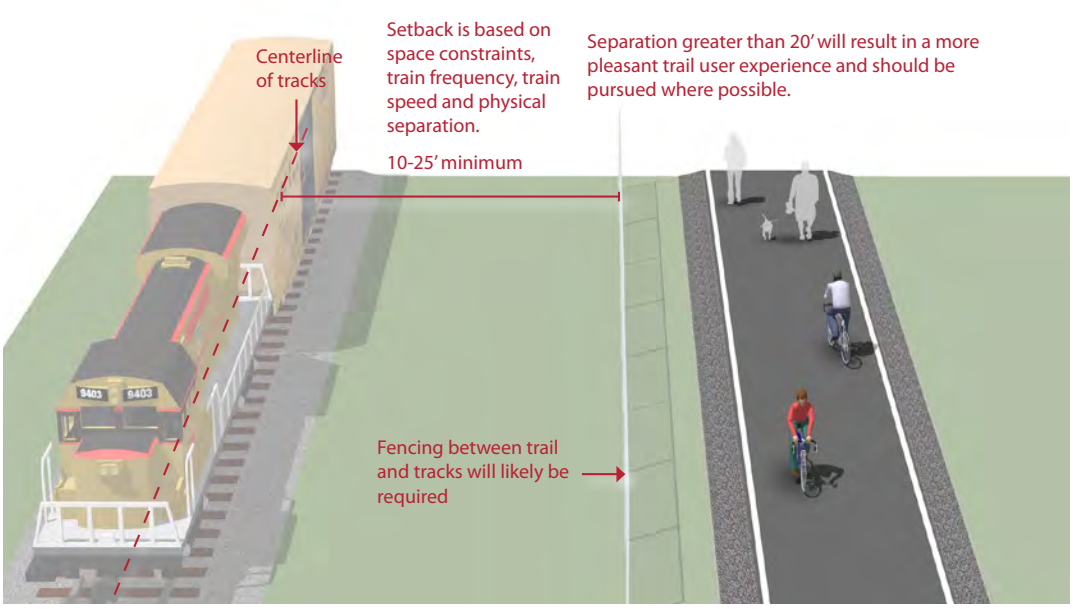
Description

Rails-with-Trails projects typically consist of paths adjacent to active railroads. It should be noted that some constraints could impact the feasibility of rail-with-trail projects. In some cases, space needs to be preserved for future planned freight, transit or commuter rail service. In other cases, limited right-of-way width, inadequate setbacks, concerns about safety/trespassing, and numerous crossings may affect a project's feasibility.

Guidance

Shared use paths in utility corridors should meet or exceed general design standards. If additional width allows, wider paths, and landscaping are desirable.

If required, fencing should be a minimum of 5 feet in height with higher fencing than usual next to sensitive areas such as switching yards. Setbacks from the active rail line will vary depending on the speed and frequency of trains, and available right-of-way.



Discussion

Railroads may require fencing with rail-with-trail projects. Concerns with trespassing and security can vary with the volume and speed of train traffic on the adjacent rail line and the setting of the shared use path, i.e. whether the section of track is in an urban or rural setting.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities*. 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
FHWA. *Rails-with-Trails: Lessons Learned.* 2002.
SCRRA. *Rail-with-Trail Design Guidelines*. 2010.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

5.3.5 LOCAL NEIGHBORHOOD ACCESSWAYS

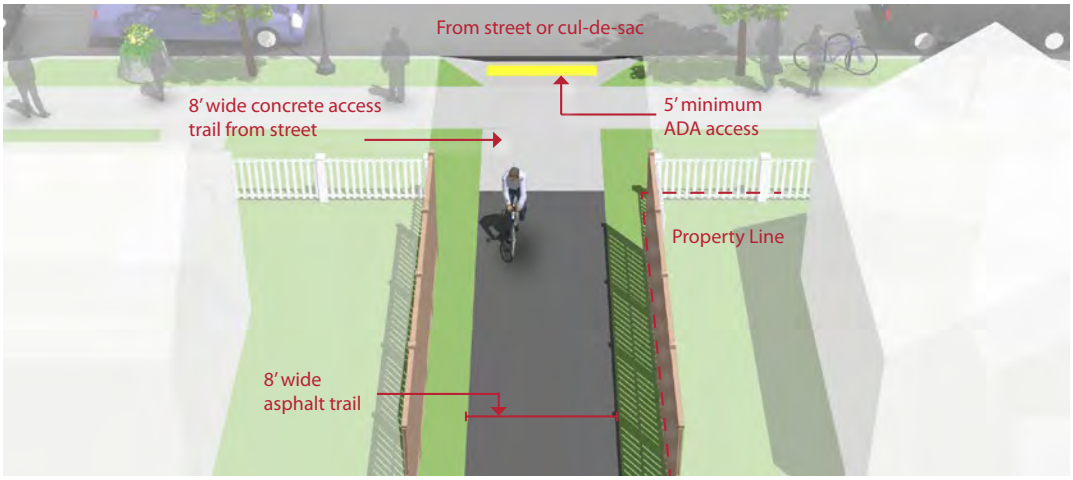
Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.

Guidance

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.



Discussion

Neighborhood accessways should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

For existing subdivisions, Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable. Nearby residents and adjacent property owners should be invited to provide landscape design input.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
FHWA. *Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.* 2006.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

5.4 PATH ROADWAY CROSSINGS

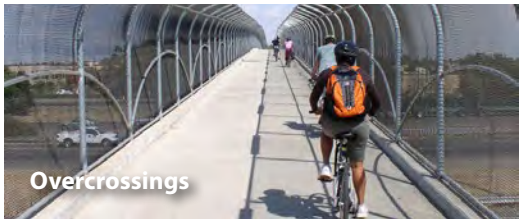
At-grade roadway crossings can create potential conflicts between path users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. This is evidenced by the thousands of successful facilities around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to provide a reasonable degree of safety and can meet existing traffic and safety standards. Path facilities that cater to bicyclists can require additional considerations due to the higher travel speed of bicyclists versus pedestrians.

Consideration must be given to adequate warning distance based on vehicle speeds and line of sight, with the visibility of any signs absolutely critical. Directing the active attention of motorists to roadway signs may require additional alerting devices such as a flashing beacon, roadway striping or changes in pavement texture. Signing for path users may include a standard "STOP" or "YIELD" sign and pavement markings, possibly combined with other features such as bollards or a bend in the pathway to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their visual impact.

A number of striping patterns have emerged over the years to delineate path crossings. A median stripe on the path approach will help to organize and warn path users. Crosswalk striping is typically a matter of local and State preference, and may be accompanied by pavement treatments to help warn and slow motorists. In areas where motorists do not typically yield to crosswalk users, additional measures may be required to increase compliance.


Marked/Unsignalized Crossings


Signalized/Controlled Crossings


Overcrossings

5.4.1 MARKED/UNSIGNALIZED CROSSINGS

Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.

Guidance

Maximum traffic volumes

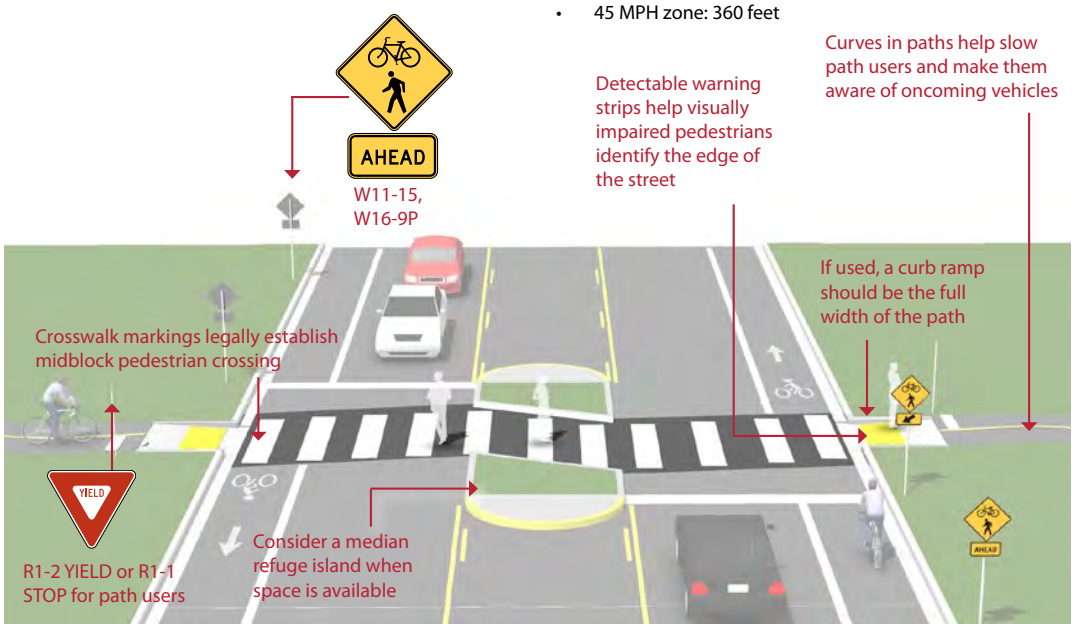
- ≤9,000-12,000 Average Daily Traffic (ADT) volume
- Up to 15,000 ADT on two-lane roads, preferably with a median
- Up to 12,000 ADT on four-lane roads with median

Maximum travel speed

- 35 MPH

Minimum line of sight

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet



Discussion

Unsignalized crossings of multi-lane arterials over 15,000 ADT may be possible with features such as sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like rectangular rapid flash beacons or in-pavement flashers, and excellent sight distance. For more information see the discussion of active warning beacons.

On roadways with low to moderate traffic volumes (<12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

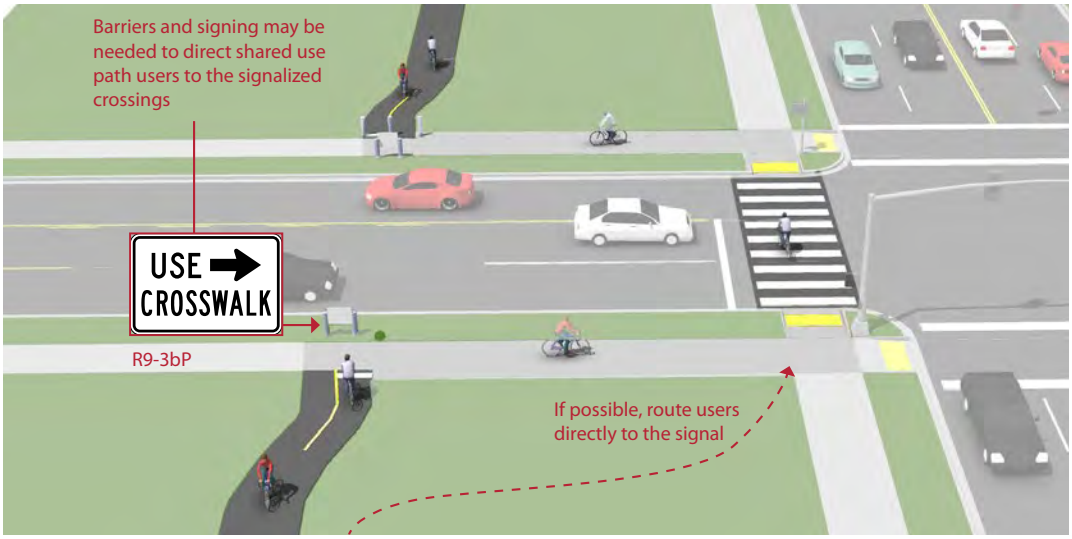
5.4.2 SIGNALIZED CROSSINGS

Description

Path crossings within approximately 400 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal. For this restriction to be effective, barriers and signing may be needed to direct path users to the signalized crossing. If no pedestrian crossing exists at the signal, modifications should be made.

Guidance

Path crossings should not be provided within approximately 400 feet of an existing signalized intersection. If possible, route path directly to the signal.



Discussion

In the US, the minimum distance a marked crossing can be from an existing signalized intersection varies from approximately 250 to 660 feet. Engineering judgement and the context of the location should be taken into account when choosing the appropriate allowable setback. Pedestrians are particularly sensitive to out of direction travel and undesired mid-block crossing may become prevalent if the distance is too great.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

If a sidewalk is used for crossing access, it should be kept clear of snow and debris and the surface should be level for wheeled users.

5.4.3 OVERCROSSINGS

Description

Bicycle/pedestrian overcrossings provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or major transportation corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist.

There are no minimum roadway characteristics for considering grade separation. Depending on the type of facility or the desired user group grade separation may be considered in many types of projects.

Overcrossings require a minimum of 17 feet of vertical clearance to the roadway below versus a minimum elevation differential of around 12 feet for an undercrossing. This results in potentially greater elevation differences and much longer ramps for bicycles and pedestrians to negotiate.

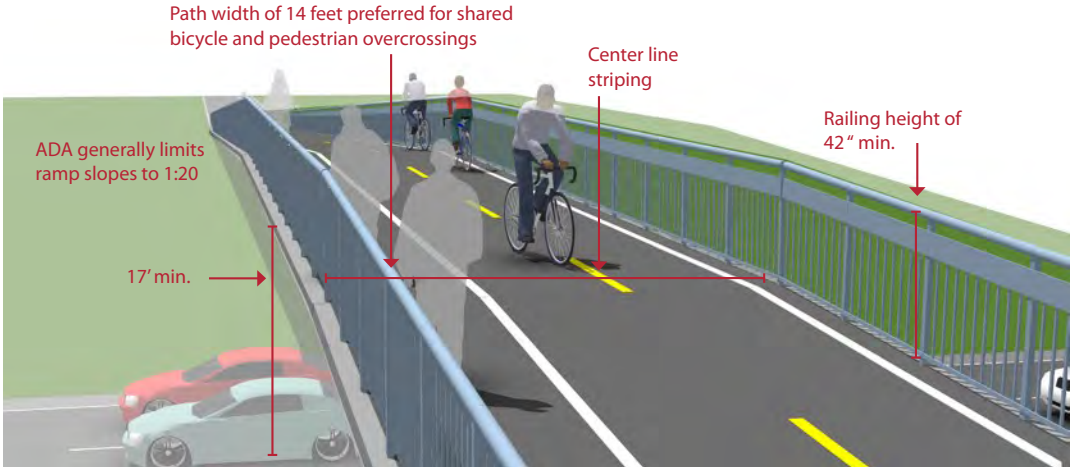
Guidance

8 foot minimum width, 14 feet preferred. If overcrossing has any scenic vistas additional width should be provided to allow for stopping. A separate 5 foot pedestrian area may be provided for facilities with high bicycle and pedestrian use.

10 foot headroom on overcrossing; clearance below will vary depending on feature being crossed.

Roadway:	17 feet
Freeway:	18.5 feet
Heavy Rail Line:	23 feet

The overcrossing should have a centerline stripe even if the rest of the path does not have one.



Discussion

Overcrossings for bicycles and pedestrians typically fall under the Americans with Disabilities Act (ADA), which strictly limits ramp slopes to 5% (1:20) with landings at 400 foot intervals, or 8.33% (1:12) with landings every 30 feet.

Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

Potential issues with vandalism.

Overcrossings can be more difficult to clear of snow than undercrossings.

5.5 SEPARATED BIKEWAYS

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.


Conventional Bicycle Lanes


Buffered Bike Lanes


Bicycle Lane and Diagonal Parking


One Way Cycle Tracks

Design Needs of Bicyclists

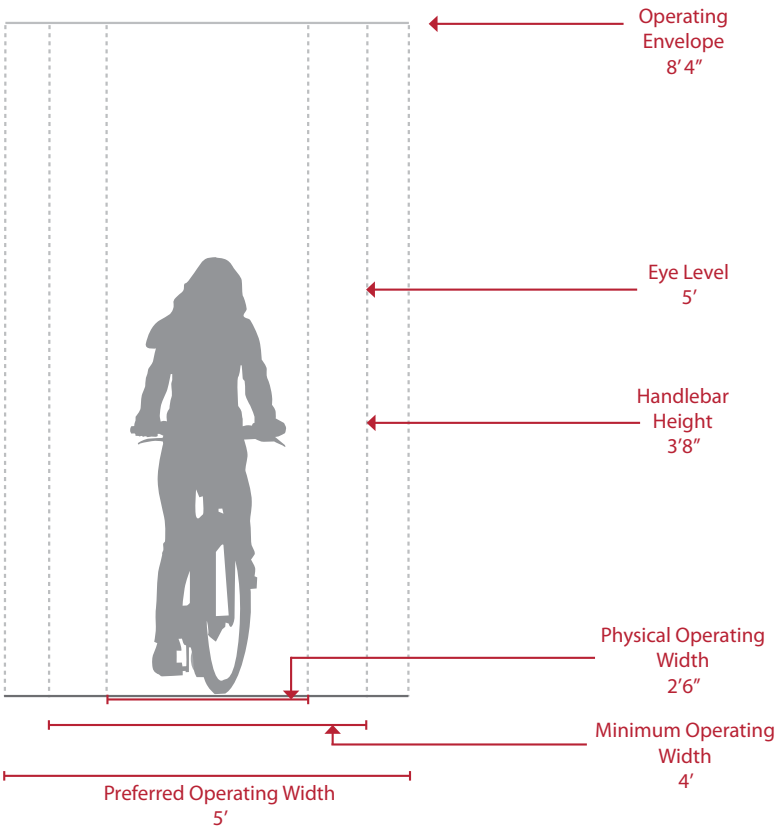
The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

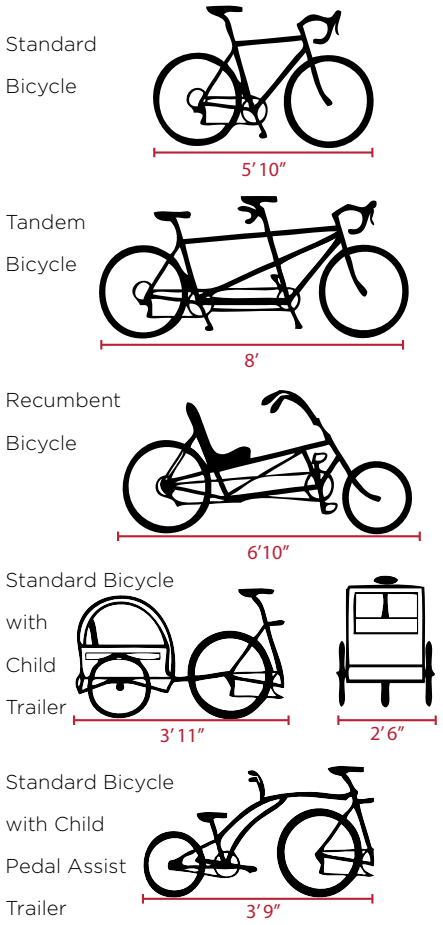
The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.

Standard Bicycle Rider Dimensions



Source: AASHTO Guide for the Development of Bicycle Facilities, 4th Edition. 2012.

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Bicycle as Design Vehicle - Typical Dimensions

Source: AASHTO *Guide for the Development of Bicycle Facilities*, 4th Edition *AASHTO does not provide typical dimensions for tricycles.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	8 ft
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 6 in

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as shared use paths. The table to the right provides typical bicyclist speeds for a variety of conditions.

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	18 mph

*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

5.5.1 BICYCLE LANE

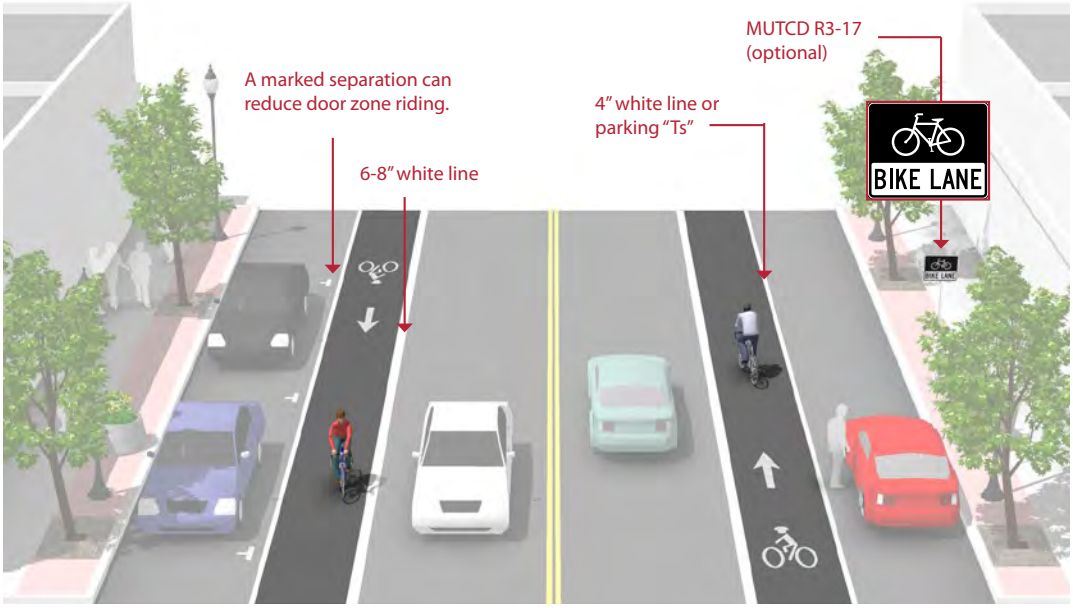
Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

Guidance

- 12 foot minimum from curb face to edge of bike lane.
- 14.5 foot preferred from curb face to edge of bike lane.
- 7 foot maximum for marked width of bike lane. Greater widths may encourage vehicle loading in bike lane. Configure as buffered bicycle lanes when a wider facility is desired.



Discussion

Bike lanes adjacent to on-street parallel parking require special treatment in order to avoid crashes caused by an open vehicle door. The bike lane should have sufficient width to allow bicyclists to stay out of the door zone while not encroaching into the adjacent vehicular lane. Parking stall markings, such as parking "Ts" and double white lines create a parking side buffer that encourages bicyclists to ride farther away from the door zone.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide*. 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

5.5.2 BICYCLE LANE AND DIAGONAL PARKING

Description

In certain areas with high parking demand such as urban commercial areas, diagonal parking can be used to increase parking supply.

Back-in diagonal parking improves sight distances between drivers and bicyclists when compared to conventional head-in diagonal parking. Back-in parking is best paired with a dedicated bicycle lane.

Conventional front-in diagonal parking is not compatible or recommended with the provision of bike lanes, as drivers backing out of conventional diagonal parking have limited visibility of approaching bicyclists. Under these conditions, shared lane markings should be used to guide bicyclists away from reversing automobiles.

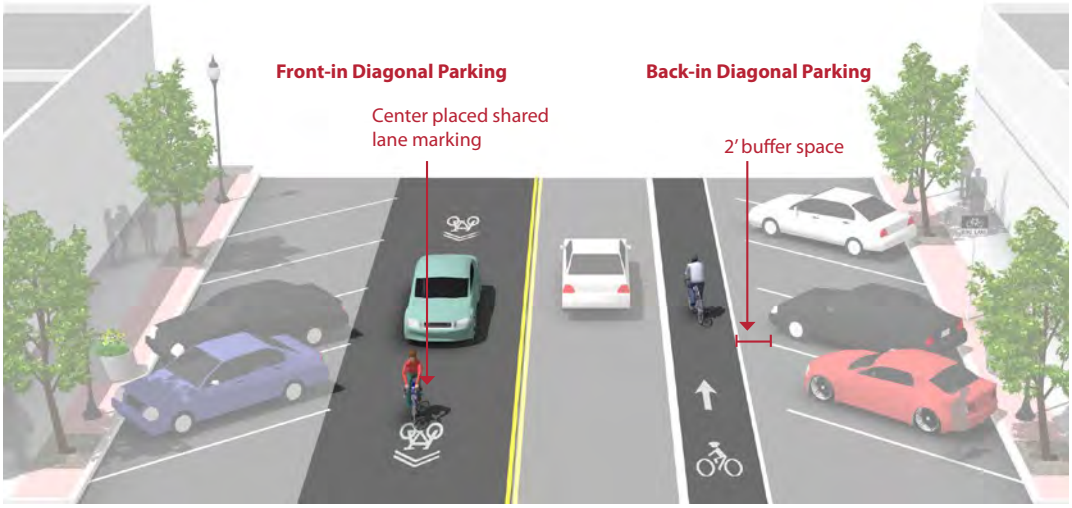
Guidance

Front-in Diagonal Parking

- Shared lane markings are the preferred facility with front-in diagonal parking

Back-in Diagonal Parking

- 5 foot minimum marked width of bike lane
- Parking bays are sufficiently long to accommodate most vehicles (so vehicles do not block bike lane)



Discussion

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

5.5.3 BUFFERED BICYCLE LANE

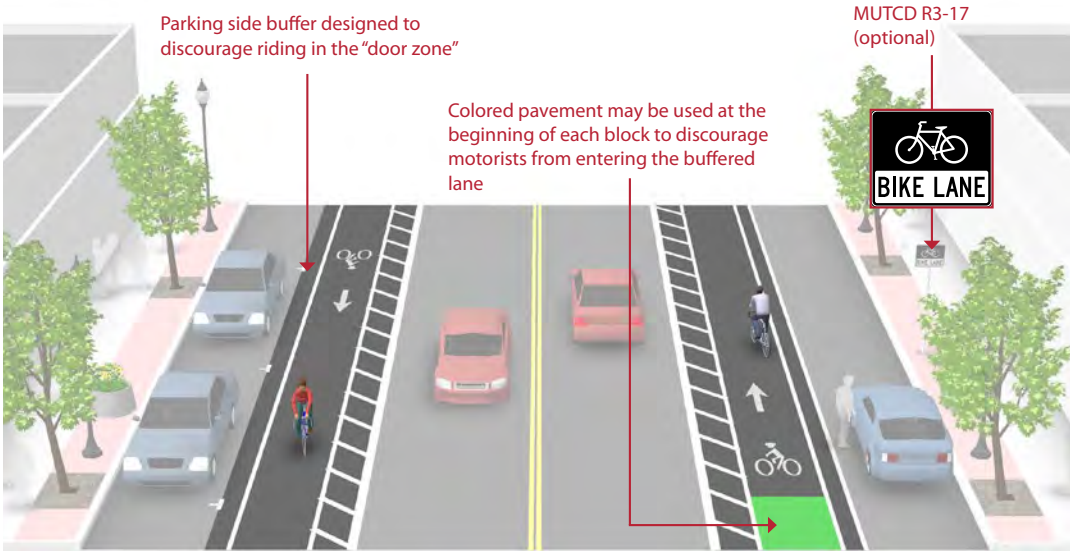
Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes follow general guidance for buffered preferential vehicle lanes as per MUTCD guidelines (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane and/or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.

Guidance

- The minimum bicycle travel area (not including buffer) is 5 feet wide.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.
- Buffered bike lanes can buffer the travel lane only, or parking lane only depending on available space and the objectives of the design.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

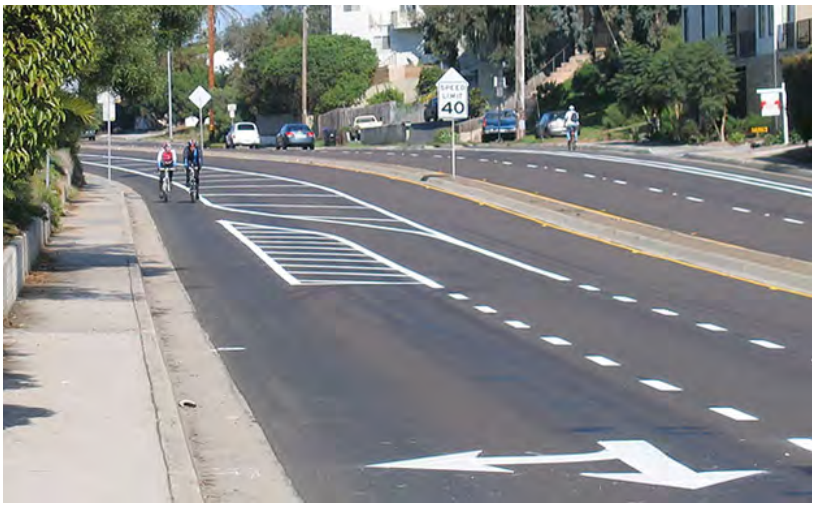
Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Travel Side Buffered Bike Lane on Sloat Blvd (SR-35), San Francisco (Photo: Mark Dreger)



Travel Side Buffered Bike Lane on Nimitz Blvd, San Diego (Photo: BikeSD)

Parking Side and Travel Side Buffered Bike Lane on Fifth Ave, San Diego (Photo: Paul Jamason)

Parking Side and Travel Side Buffered Bike Lane on Fifth Ave, San Diego (Photo: Paul Jamason)

Travel Side Buffered Bike Lane on PCH (SR-1), Dana Point (Photo: Google Street View)

Two-Way Buffered Bike Lane on Brink Ave, Modesto (Photo: Streetsblog)

5.5.2 CLASS IV SEPARATED BIKEWAY

Description

Protection is provided through physical barriers and can include bollards, parking, a planter strip, an extruded curb, or on-street parking. Separated bikeways using these protection elements typically share the same elevation as adjacent travel lanes.

Raised separated bikeways may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the bikeway from the pedestrian area.

Guidance

- Separated bikeways should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles. Separated bikeways located on one-way streets have fewer potential conflict areas than those on two-way streets.
- In situations where on-street parking is allowed, separated bikeways shall be located between the parking lane and the sidewalk (in contrast to bike lanes).

Discussion

Sidewalks or other pedestrian facilities should not be narrowed to accommodate the cycle track as pedestrians will likely walk on the bikeway if sidewalk capacity is reduced. Visual and physical cues (e.g., pavement markings & signage) should be used to make it clear where bicyclists and pedestrians should be traveling. If possible, separate the bikeway and pedestrian zone with a furnishing zone.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.
FHWA. *Separated Bike Lane Planning and Design Guide*. 2015.
Caltrans. *Design Information Bulletin #89 - Class IV Bikeway Guidance*. 2015

Materials and Maintenance

Barrier-separated and raised separated bikeways may require special equipment for sweeping and cleaning.

Two-Way Cycle Track (Separated Bikeway) along Harbor Drive, San Diego (Photo: Stephan Vance)

Two-Way Cycle Track (Separated Bikeway) Westwood Blvd, Redondo Beach (Photo: Jim Lyle)

5.6 SEPARATED BIKEWAYS AT INTERSECTIONS

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.


Colored Bike Lanes in Conflict Areas


Bike Lanes at Right Turn Only Lanes

Shared Bicycle/Right Turn Lane


Intersection Crossing Markings


Bike Boxes


Two Stage Turn Boxes

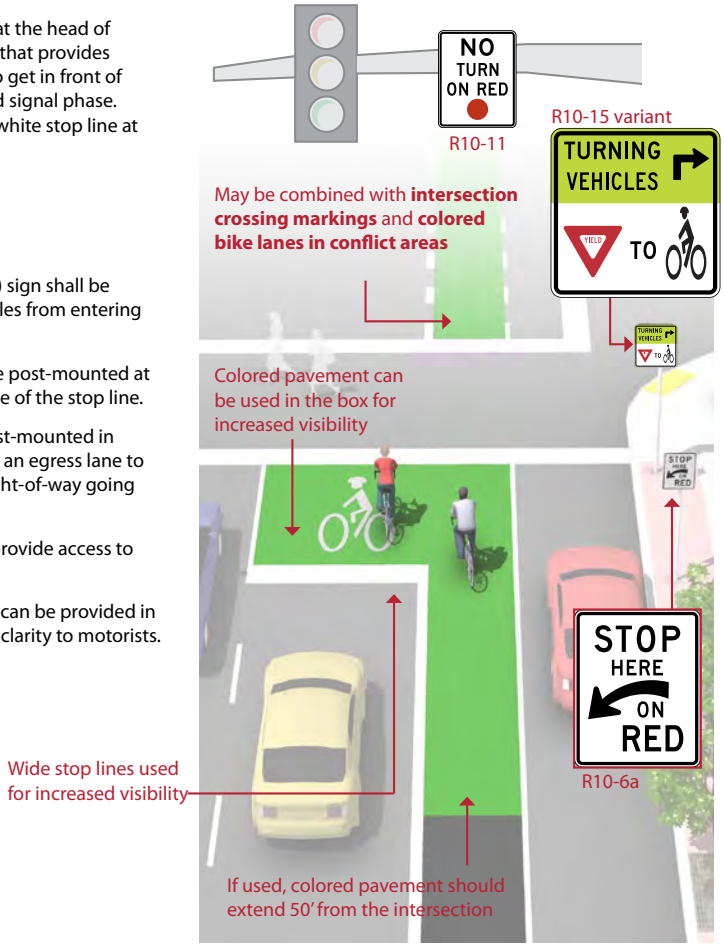
5.6.1 BIKE BOX

Description

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing motorized traffic during the red signal phase. Motor vehicles must queue behind the white stop line at the rear of the bike box.

Guidance

- 14' minimum depth
- A "No Turn on Red" (MUTCD R10-11) sign shall be installed overhead to prevent vehicles from entering the Bike Box.
- A "Stop Here on Red" sign should be post-mounted at the stop line to reinforce observance of the stop line.
- A "Yield to Bikes" sign should be post-mounted in advance of and in conjunction with an egress lane to reinforce that bicyclists have the right-of-way going through the intersection.
- An ingress lane should be used to provide access to the box.
- A supplemental "Wait Here" legend can be provided in advance of the stop bar to increase clarity to motorists.



Discussion

Bike boxes are considered experimental by the FHWA.
Bike boxes should be placed only at signalized intersections, and right turns on red shall be prohibited for motor vehicles. Bike boxes should be used in locations that have a large volume of bicyclists and are best utilized in central areas where traffic is usually moving more slowly. Prohibiting right turns on red improves safety for bicyclists yet does not significantly impede motor vehicle travel.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide.* 2012.
FHWA. Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10. 2011.

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

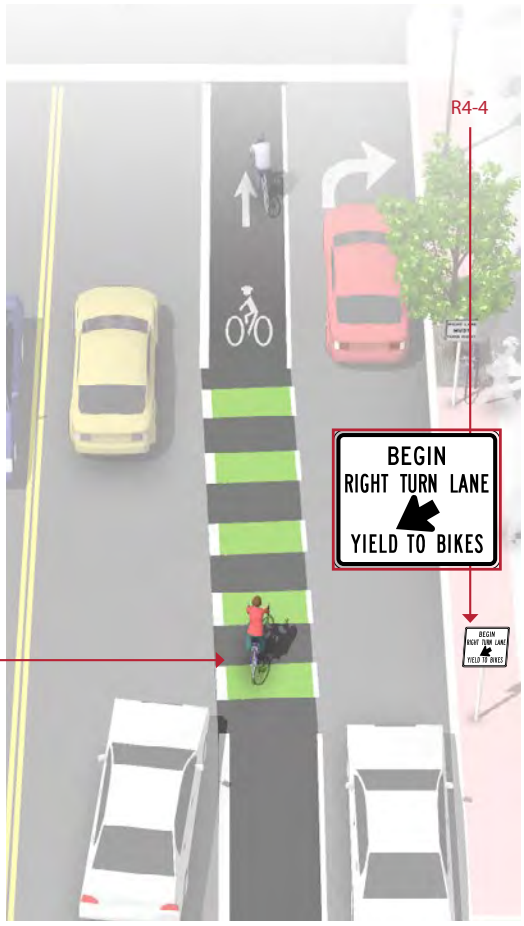
5.6.2 COLORED BIKE LANE IN CONFLICT AREAS

Description

Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

Guidance

- Green colored pavement was given interim approval by the Federal Highways Administration in March 2011. See interim approval for specific colored pavement standards.
- The colored surface should be skid resistant and retro-reflective.
- A "Yield to Bikes" sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.



Discussion

Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

Additional References and Guidelines

FHWA. Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10. 2011.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

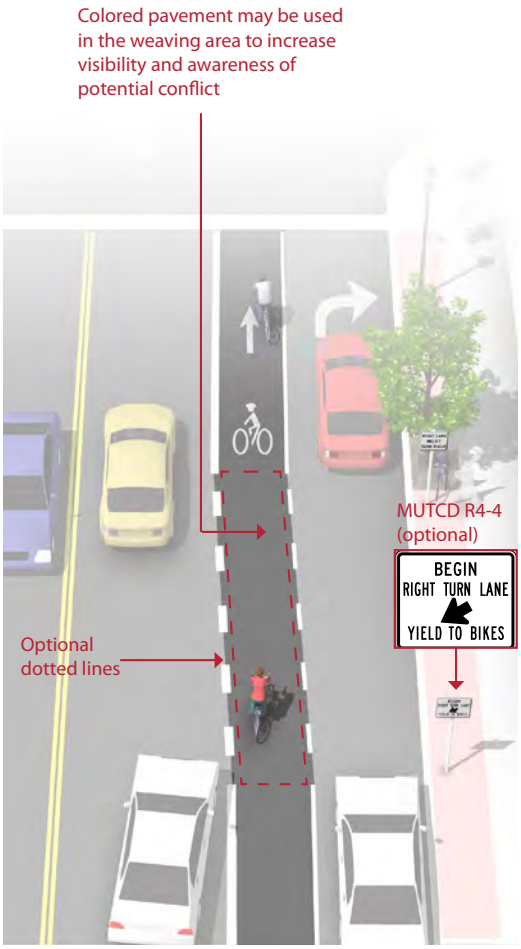
Colored Bicycle Lane in Conflict Area on 3rd St at Lime Ave, Long Beach (Photo: Streetsblog)

5.6.3 BIKE LANE AT RIGHT TURN ONLY LANE

Description

The appropriate treatment at right-turn lanes is to place the bike lane between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a shared bike lane/turn lane.

The design (right) illustrates a bike lane pocket, with signage indicating that motorists should yield to bicyclists through the conflict area.



Guidance

At auxiliary right turn only lanes (add lane):

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using colored conflict areas to promote visibility of the mixing zone.

Where a through lane becomes a right turn only lane:

- Do not define a dotted line merging path for bicyclists.
- Drop the bicycle lane in advance of the merge area.
- Use shared lane markings to indicate shared use of the lane in the merging zone.

Discussion

For other potential approaches to providing accommodations for bicyclists at intersections with turn lanes, please see guidance on shared bike lane/turn lane, bicycle signals, and colored bike facilities.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide*. 2012.

Materials and Maintenance

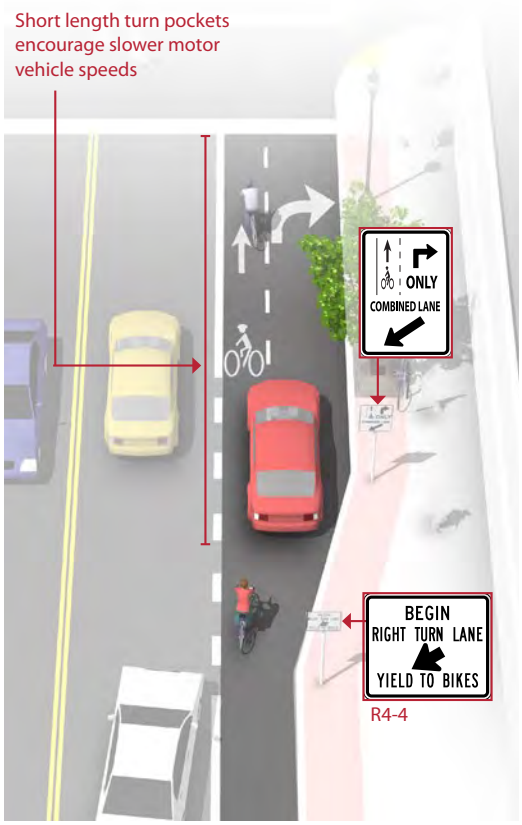
Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

5.6.4 COMBINED BIKE LANE/TURN LANE

Description

The combined bike lane/turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.



Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A "Right Turn Only" sign with an "Except Bicycles" plaque may be needed to make it legal for through bicyclists to use a right turn lane.

Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.

Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.

5.6.5 TWO-STAGE TURN BOX

Description

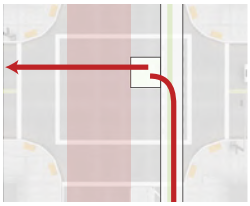
Two-stage turn queue boxes offer bicyclists a safe way to make left turns at multi-lane signalized intersections from a right side cycle track or bike lane.

On right side cycle tracks, bicyclists are often unable to merge into traffic to turn left due to physical separation, making the provision of two-stage left turn boxes critical. Design guidance for two-stage turns apply to both bike lanes and cycle tracks.

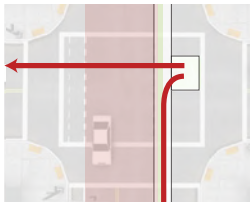
Guidance

- The queue box shall be placed in a protected area. Typically this is within an on-street parking lane or cycle track buffer area.
- 6' minimum depth of bicycle storage area
- Bicycle stencil and turn arrow pavement markings shall be used to indicate proper bicycle direction and positioning.
- A "No Turn on Red" (MUTCD R10-11) sign shall be installed on the cross street to prevent vehicles from entering the turn box.

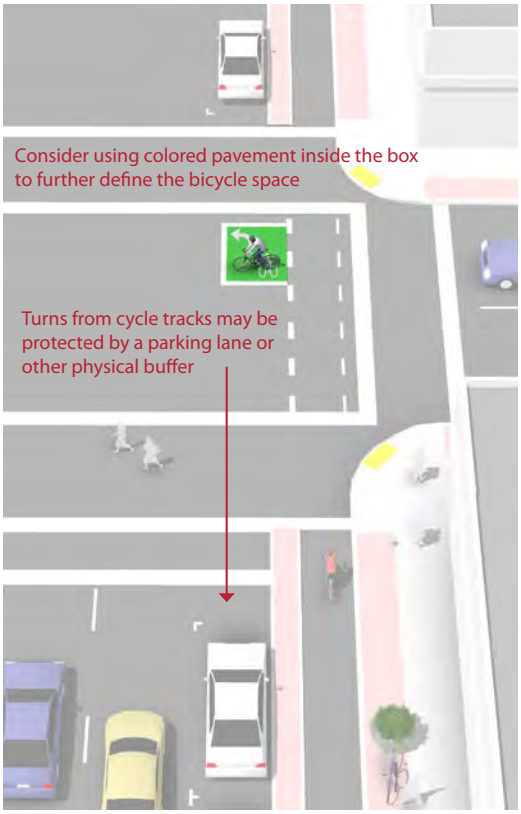
Cycle track turn box protected by physical buffer:



Bike lane turn box protected by parking lane:



Turns from a bicycle lane may be protected by an adjacent parking lane or crosswalk setback space



Discussion

Two-Stage Turn boxes are considered experimental by FHWA.

While two stage turns may increase bicyclist comfort in many locations, this configuration will typically result in higher average signal delay for bicyclists due to the need to receive two separate green signal indications (one for the through street, followed by one for the cross street) before proceeding.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.

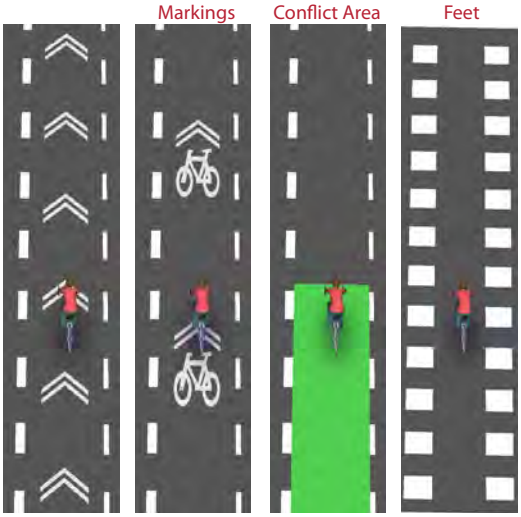
Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates.

5.6.6 INTERSECTION CROSSING MARKINGS

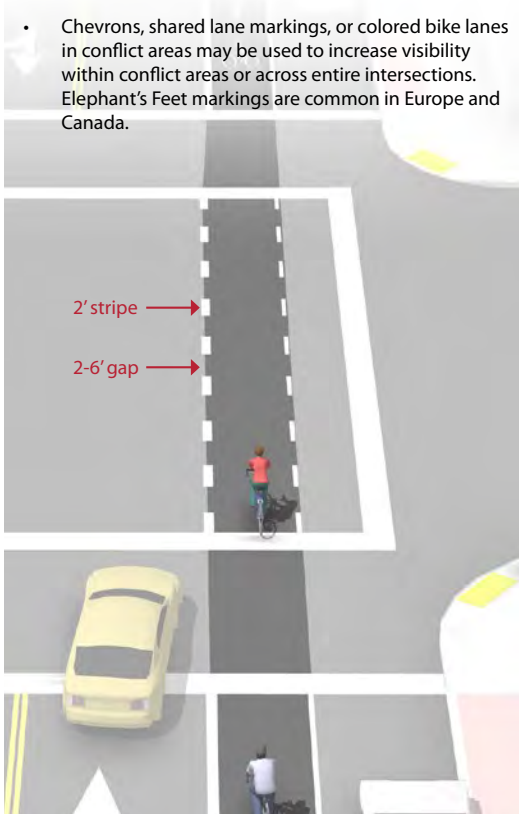
Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



Guidance

- See MUTCD Section 3B.08: "dotted line extensions"
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or colored bike lanes in conflict areas may be used to increase visibility within conflict areas or across entire intersections. Elephant's Feet markings are common in Europe and Canada.



Discussion

Additional markings such as chevrons, shared lane markings, or colored bike lanes in conflict areas are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3A.06).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

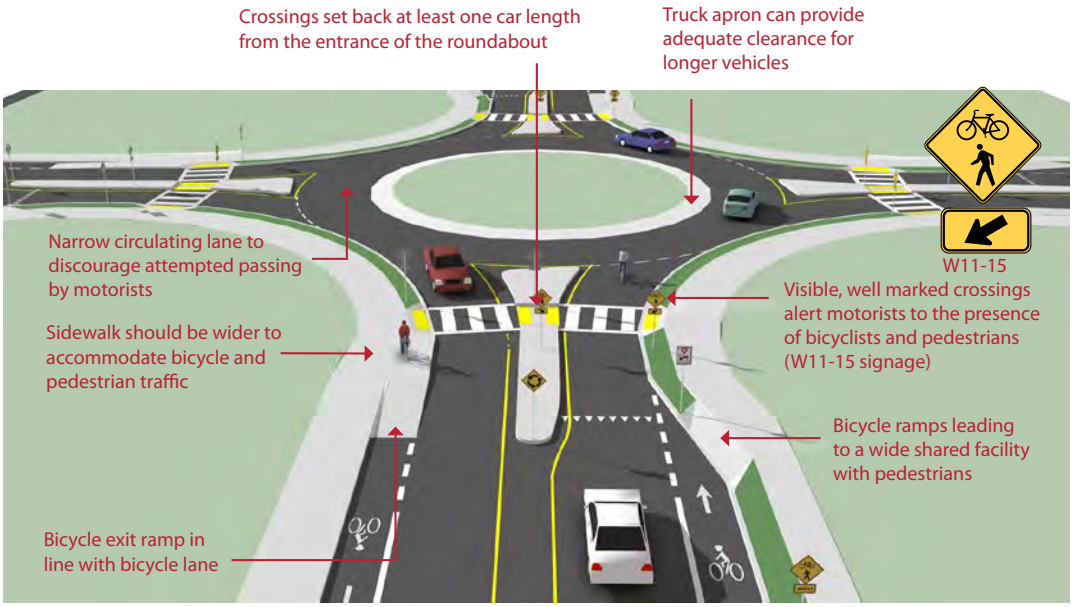
5.6.7 BICYCLES AT SINGLE LANE ROUNDABOUTS

Description

In single lane roundabouts it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

Guidelines

- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to "take the lane."
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.



Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.

FHWA. *Roundabouts: An Informational Guide.* 2000.
TRB. *Roundabouts: An Informational Guide, Second Edition.* NCHRP 672. 2010.

Materials and Maintenance

Signage and striping require routine maintenance.

5.6.8 BIKE LANES AT DIVERGING RAMPS

Description

Some arterials may contain high speed freeway-style designs such as merge lanes and exit ramps, which can create difficulties for bicyclists. The entrance and exit lanes typically have intrinsic visibility problems because of low approach angles and feature high speed differentials between bicyclists and motor vehicles.

Strategies to improve safety focus on increasing sight distances, creating formal crossings, and minimizing crossing distances.

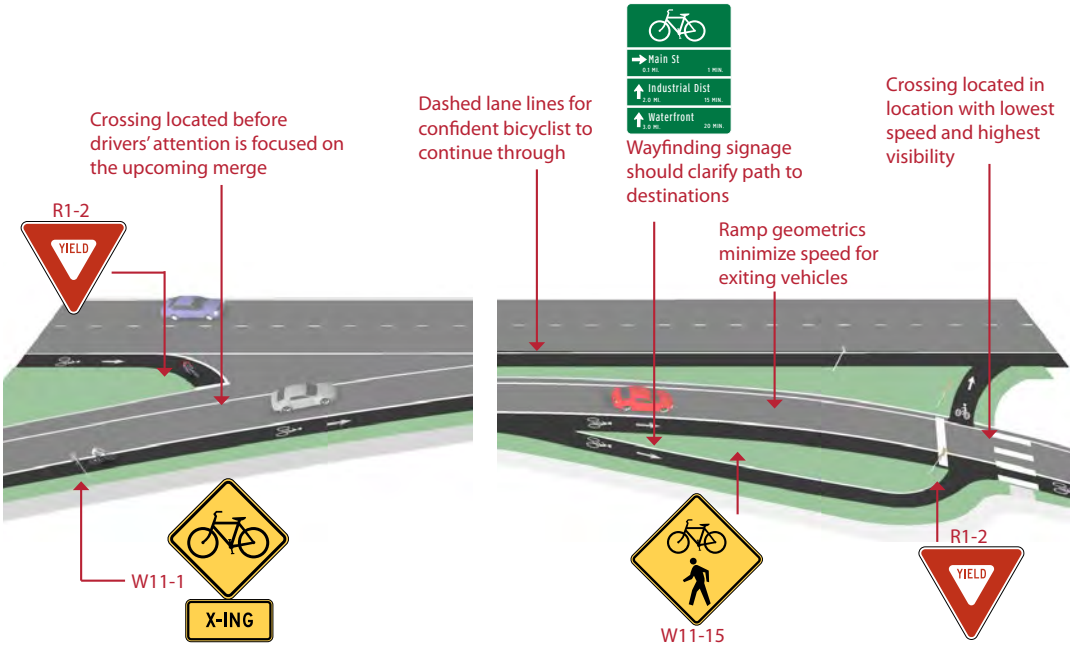
Guidance

Entrance Ramps:

Angle the bike lane to increase the approach angle with entering traffic. Position crossing before drivers' attention is focused on the upcoming merge.

Exit Ramps:

Use a jug handle turn to bring bicyclists to increase the approach angle with exiting traffic, and add yield striping and signage to the bicycle approach.



Discussion

While the jug-handle approach is the preferred configuration at exit ramps, provide the option for through bicyclists to perform a vehicular merge and proceed straight through under safe conditions.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities*. 2012.

FHWA. *Manual on Uniform Traffic Control Devices*. 2009.
FHWA. *Bicycle and Pedestrian Transportation. Lesson 15: Bicycle Lanes*. 2006.

Materials and Maintenance

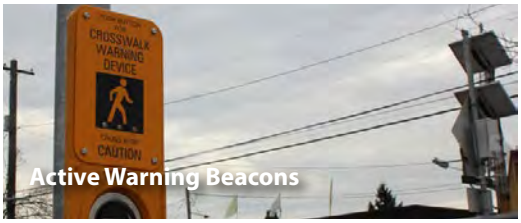
Locate crossing markings out of wheel tread when possible to minimize wear and maintenance costs.

5.7 SIGNALIZATION

Bicycle signals and beacons facilitate bicyclist crossings of roadways. Bicycle signals make crossing intersections safer for bicyclists by clarifying when to enter an intersection and by restricting conflicting vehicle movements. Bicycle signals are traditional three lens signal heads with green, yellow and red bicycle stenciled lenses that can be employed at standard signalized intersections. Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to supplement these facilities for both bicyclists and motorists.

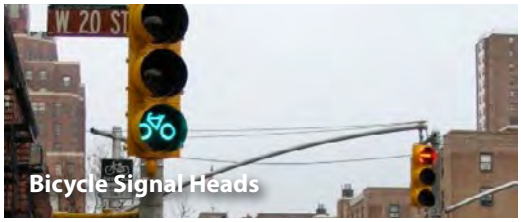
Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, Average Daily Traffic (ADT), anticipated bicycle crossing traffic, and the configuration of planned or existing bicycle facilities. Signals may be necessary as part of the construction of a protected bicycle facility such as a cycle track with potential turning conflicts, or to decrease vehicle or pedestrian conflicts at major crossings. An intersection with bicycle signals may reduce stress and delays for a crossing bicyclist, and discourage illegal and unsafe crossing maneuvers.


Bicycle Detection and Actuation



Active Warning Beacons


Hybrid Beacons (HAWK)



Bicycle Signal Heads

5.7.1 BICYCLE DETECTION AND ACTUATION

Description

Push Button Actuation

User-activated button mounted on a pole facing the street.

Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

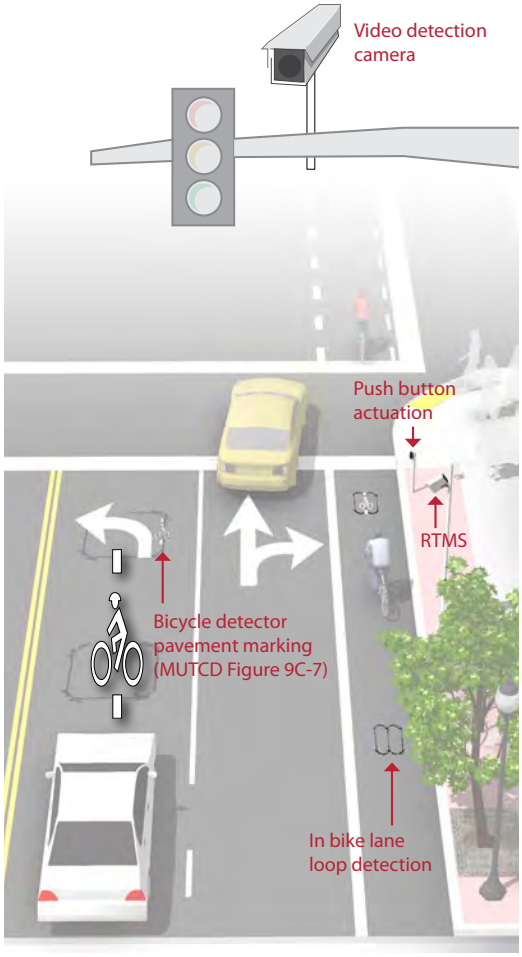
Loops that are sensitive enough to detect bicycles should be supplemented with pavement markings to instruct bicyclists how to trip them.

Video Detection Cameras

Video detection systems use digital image processing to detect a change in the image at a location. These systems can be calibrated to detect bicycles. Video camera system costs range from $20,000 to $25,000 per intersection.

Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method marks the detected object with a time code to determine its distance from the sensor. The RTMS system is unaffected by temperature and lighting, which can affect standard video detection.



Discussion

Proper bicycle detection should meet two primary criteria: 1) accurately detects bicyclists and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand).

Bicycle loops and other detection mechanisms can also provide bicyclists with an extended green time before the light turns yellow so that bicyclists of all abilities can reach the far side of the intersection.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Signal detection and actuation for bicyclists should be maintained with other traffic signal detection and roadway pavement markings.

Bicycle Detector Pavement Marking, San Luis Obispo (Photo: NACTO)

Bicycle Detection Instruction Sign, San Luis Obispo (Photo: NACTO)

5.7.2 HYBRID BEACON

Description

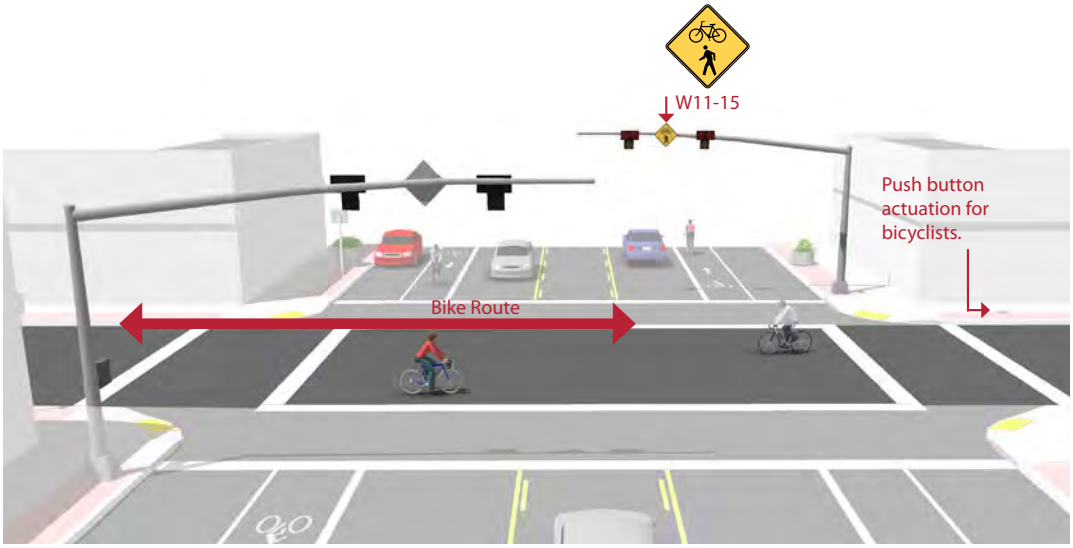
A hybrid beacon, formerly known as a High-intensity Activated CrosswalK (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street. There are no signal indications for motor vehicles on the minor street approaches.

Hybrid beacons are used to improve non-motorized crossings of major streets in locations where side-street volumes do not support installation of a conventional traffic signal or where there are concerns that a conventional signal will encourage additional motor vehicle traffic on the minor street. Hybrid beacons may also be used at mid-block crossing locations.

Guidance

Hybrid beacons may be installed without meeting traffic control signal warrants if roadway speed and volumes are excessive for comfortable user crossing.

- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Discussion

The hybrid beacon can significantly improve the operation of a bicycle route, particularly along neighborhood greenway corridors. Because of the low traffic volumes on these facilities, intersections with major roadways are often unsignalized, creating difficult and potentially unsafe crossing conditions for bicyclists.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

FHWA. *Pedestrian Hybrid Beacon Guide - Recommendations and Case Study.* 2014.
NACTO. *Urban Bikeway Design Guide.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

5.8 SHARED ROADWAYS

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

Neighborhood Greenways

Neighborhood greenways are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume local streets where motorists and bicyclists share the same travel lane. Treatments for neighborhood greenways are selected as necessary to create appropriate automobile volumes and speeds, and to provide safe crossing opportunities of busy streets.

Signed Shared Roadway


Marked Shared Roadway


Shared Roadways with Diagonal Parking


Neighborhood Greenways

5.8.1 SIGNED SHARED ROADWAY

Description

Signed shared roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

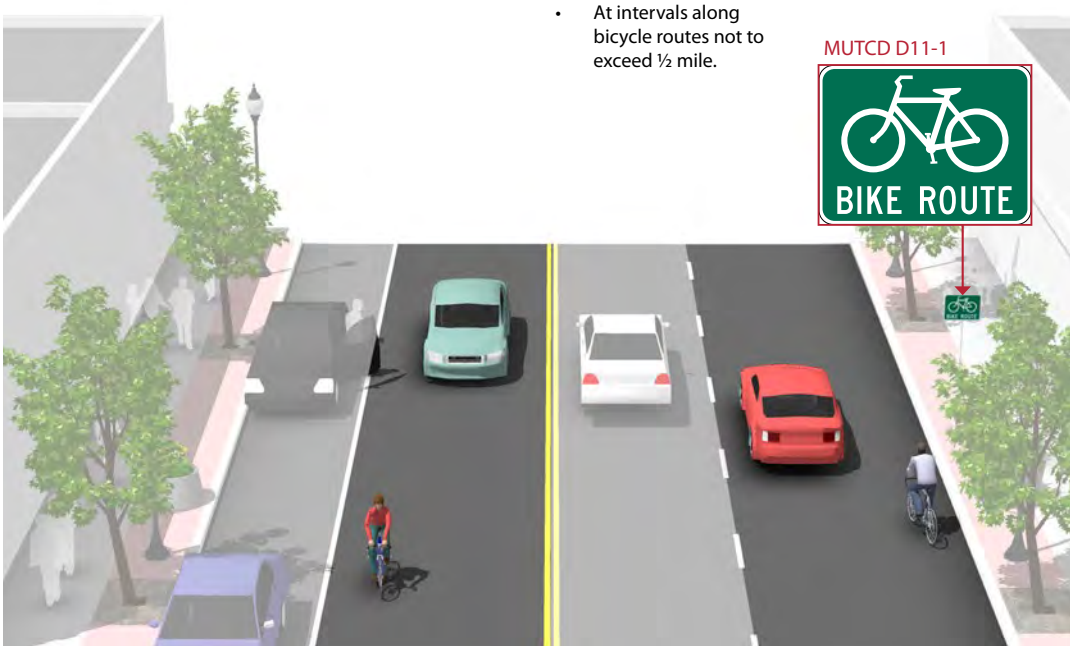
Guidance

Lane width varies depending on roadway configuration.

Bike route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.

MUTCD D11-1



Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a neighborhood greenway due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

5.8.2 MARKED SHARED ROADWAY

Description

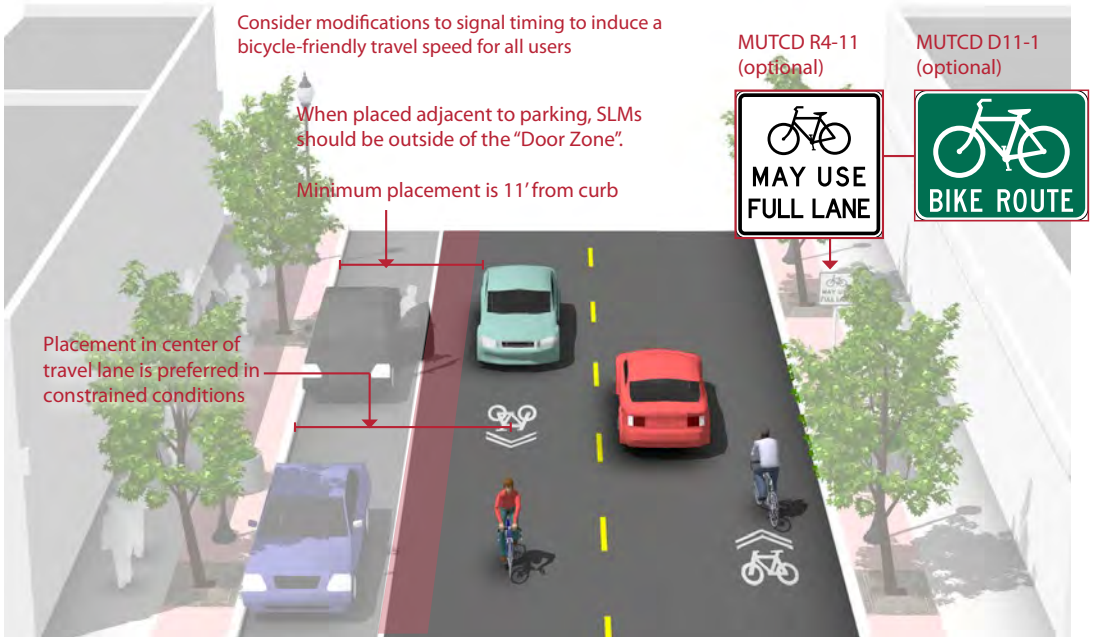
A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.

In constrained conditions, the SLMs are placed in the middle of the lane. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.

Guidance

- May be used on streets with a speed limit of 35 mph or under. Lower than 30 mph speed limit preferred.
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.



Discussion

If collector or arterial, this should not be a substitute for dedicated bicycle facilities if space is available.

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated bike lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07)

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

5.9 BIKEWAY SIGNING

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems.

Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.


Wayfinding Sign Types


Wayfinding Sign Placement

5.9.1 WAYFINDING SIGN TYPES

Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

Confirmation Signs

Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.

Can include destinations and distance/time. Do not include arrows.

Turn Signs

Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.

Include destinations and arrows.

Decisions Signs

Mark the junction of two or more bikeways.

Inform bicyclists of the designated bike route to access key destinations. Includes destinations and arrows and distances.

Travel times are optional but recommended.

Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

5.9.2 WAYFINDING SIGN PLACEMENT

Confirmation Signs

Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs

Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.

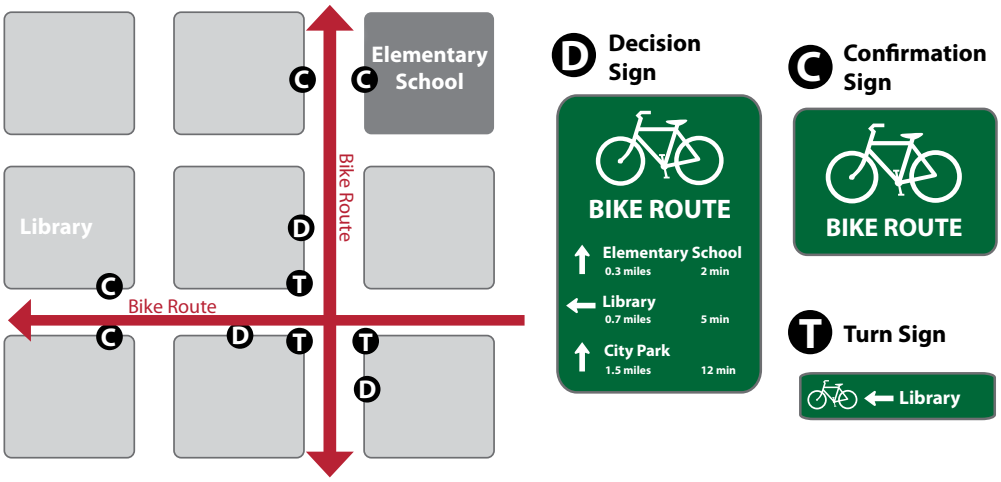
Guidance

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

Decisions Signs

Near-side of intersections in advance of a junction with another bicycle route.

Along a route to indicate a nearby destination.



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to 5 miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

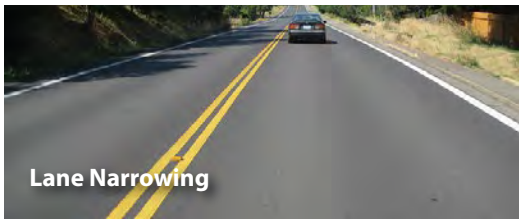
Materials and Maintenance

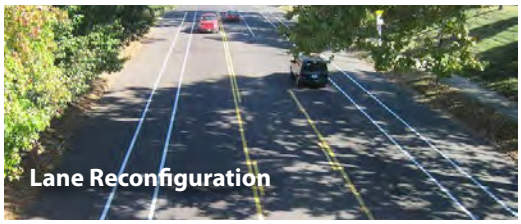
Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

5.10 RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.


Lane Narrowing


Lane Reconfiguration

5.10.1 LANE NARROWING

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.

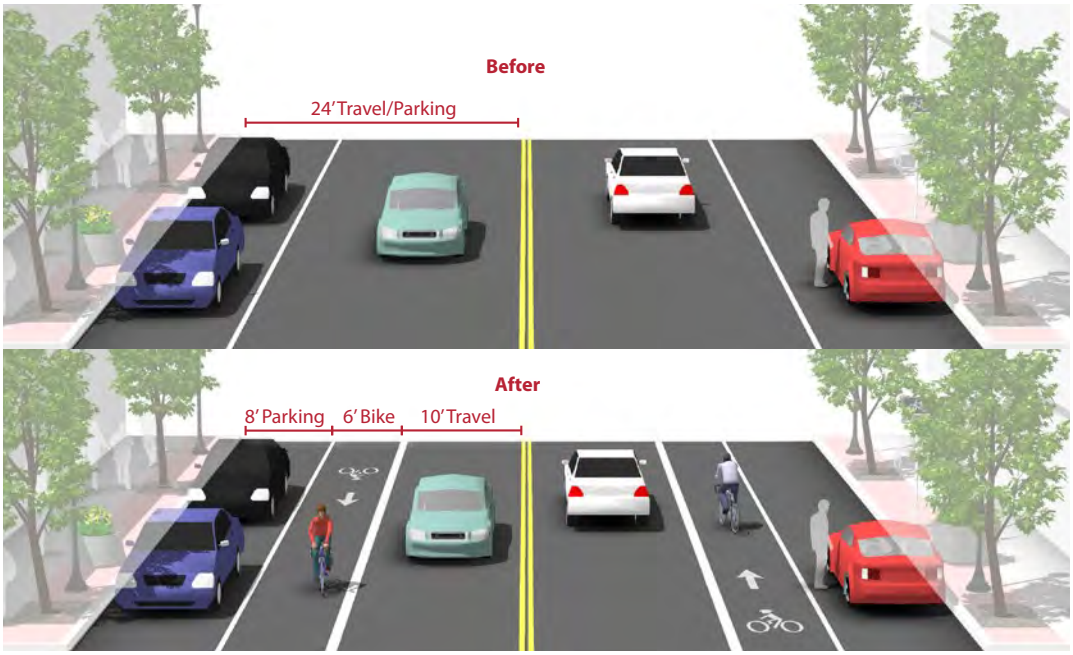
Guidance

Vehicle lane width:

- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on bicycle lanes applies to this treatment.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."*

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *A Policy on Geometric Design of Highways and Streets.* 2004.
NACTO. *Urban Street Design Guide.* 2013.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

5.10.2 LANE RECONFIGURATION

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.

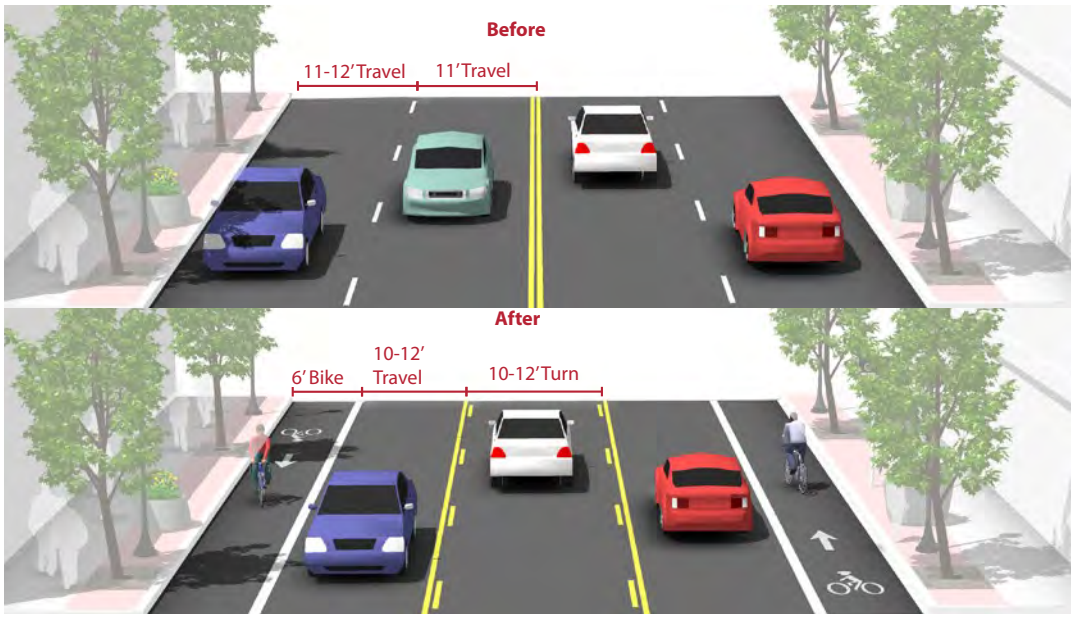
Guidance

Vehicle lane width:

- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on bicycle lanes applies to this treatment.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities*. 2012.
FHWA. *Evaluation of Lane Reduction "Road Diet" Measures on Crashes*. Publication Number: FHWA-HRT-10-053. 2010.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

5.11 BICYCLE SUPPORT FACILITIES

Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of 2 hours or less, or long-term parking for employees, students, residents, and commuters.

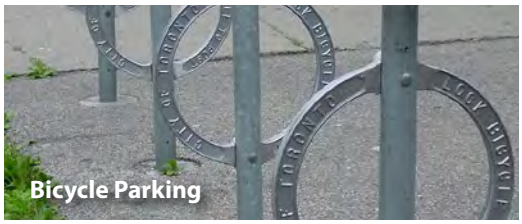
Access to Transit

Safe and easy access to bicycle parking facilities is necessary to encourage commuters to access transit via bicycle. Providing bicycle access to transit and space for bicycles on buses and rail vehicles can increase the feasibility of transit in lower-density areas, where transit stops are beyond walking distance of many residences. People are often willing to walk only a quarter- to half-mile to a bus stop, while they might bike as much as two or more miles to reach a transit station.

Roadway Construction and Repair

Safety of all roadway users should be considered during road construction and repair. Wherever bicycles are allowed, measures should be taken to provide for the continuity of a bicyclist's trip through a work zone area.

Only in rare cases should pedestrians and bicyclists be detoured to another street when travel vehicle lanes remain open. Contractors performing work should be made aware of the needs of bicyclists and be properly trained in how to safely route bicyclists through or around work zones.


Bicycle Parking


Bicycle Access to Transit


Access through Construction Areas

5.11.1 BICYCLE RACKS

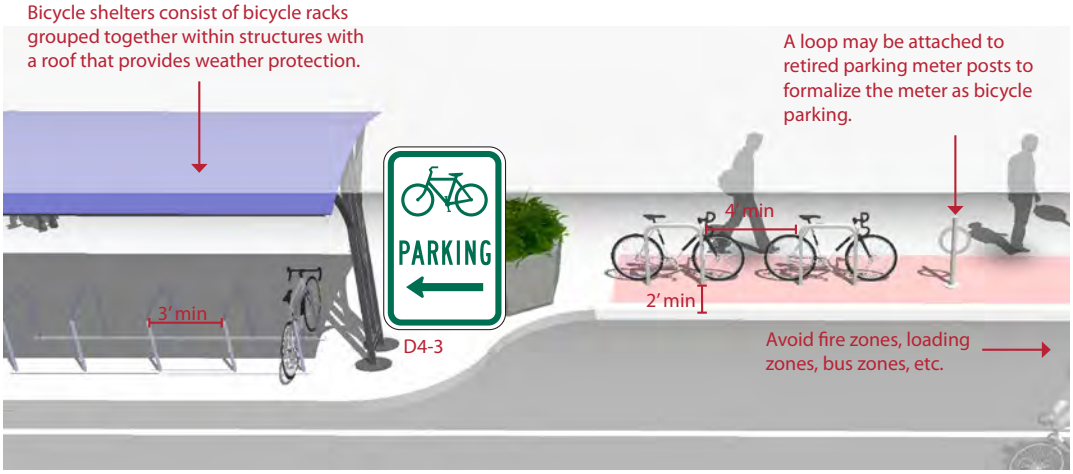
Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

- Supports the bicycle in at least two places, preventing it from falling over.
- Allows locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Should be highly visible from adjacent bicycle routes and pedestrian traffic.
- Locate racks in areas that cyclists are most likely to travel.



Discussion

Where the placement of racks on sidewalks is not possible (due to narrow sidewalk width, sidewalk obstructions, street trees, etc.), bicycle parking can be provided in the street where on-street vehicle parking is allowed in the form of on-street bicycle corrals.

Some types of bicycle racks may meet design criteria, but are discouraged except in limited situations. This includes undulating "wave" racks, schoolyard "wheel bender" racks, and spiral racks.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
APBP. *Bicycle Parking Guide 2nd Edition.* 2010.

Materials and Maintenance

Use of proper anchors will prevent vandalism and theft. Racks and anchors should be regularly inspected for damage. Educate snow removal crews to avoid burying racks during winter months.

5.11.2 ON-STREET BICYCLE CORRAL

Description

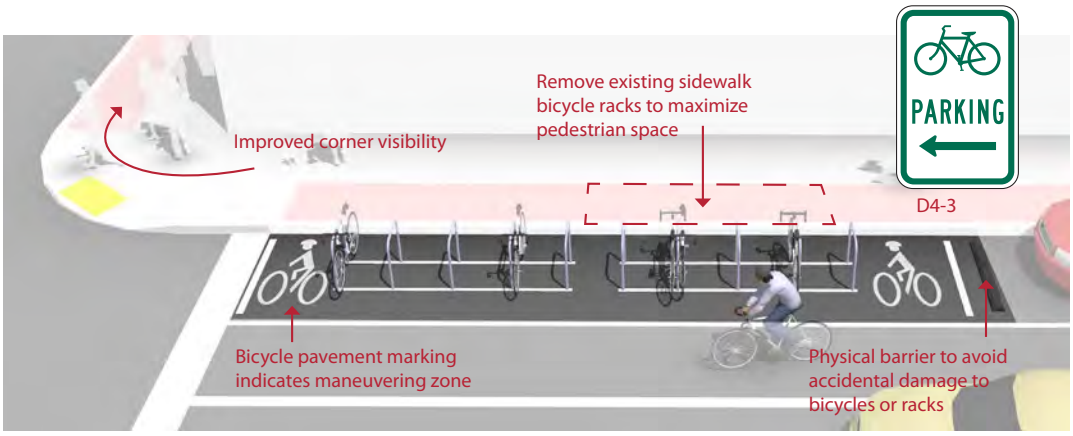
Bicycle corrals (also known as on-street bicycle parking) consist of bicycle racks grouped together in a common area within the street traditionally used for automobile parking. Bicycle corrals are reserved exclusively for bicycle parking and provide a relatively inexpensive solution to providing high-volume bicycle parking. Bicycle corrals can be implemented by converting one or two on-street motor vehicle parking spaces into on-street bicycle parking. Each motor vehicle parking space can be replaced with approximately 6-10 bicycle parking spaces.

Bicycle corrals move bicycles off the sidewalks, leaving more space for pedestrians, sidewalk café tables, etc. Because bicycle parking does not block sightlines (as large motor vehicles would do), it may be possible to locate bicycle parking in 'no-parking' zones near intersections and crosswalks.

Guidance

See guidelines for sidewalk bicycle rack placement and clear zones.

- Bicyclists should have an entrance width from the roadway of 5' – 6'.
- Can be used with parallel or angled parking.
- Parking stalls adjacent to curb extensions are good candidates for bicycle corrals since the concrete extension serves as delimitation on one side.



Discussion

In many communities, the installation of bicycle corrals is driven by requests from adjacent businesses, and is not a city-driven initiative. In such cases, the city does not remove motor vehicle parking unless it is explicitly requested. In other areas, the city provides the facility and business associations take responsibility for the maintenance of the facility. Communities can establish maintenance agreements with the requesting business. Bicycle corrals can be especially effective in areas with high bicycle parking demand or along street frontages with narrow sidewalks where parked bicycles would be detrimental to the pedestrian environment.

Additional References and Guidelines

APBP. *Bicycle Parking Guide 2nd Edition.* 2010.

Materials and Maintenance

Physical barriers may obstruct drainage and collect debris. Establish a maintenance agreement with neighboring businesses. In snowy climates the bicycle corral may need to be removed during the winter months.

5.11.3 BICYCLE LOCKERS

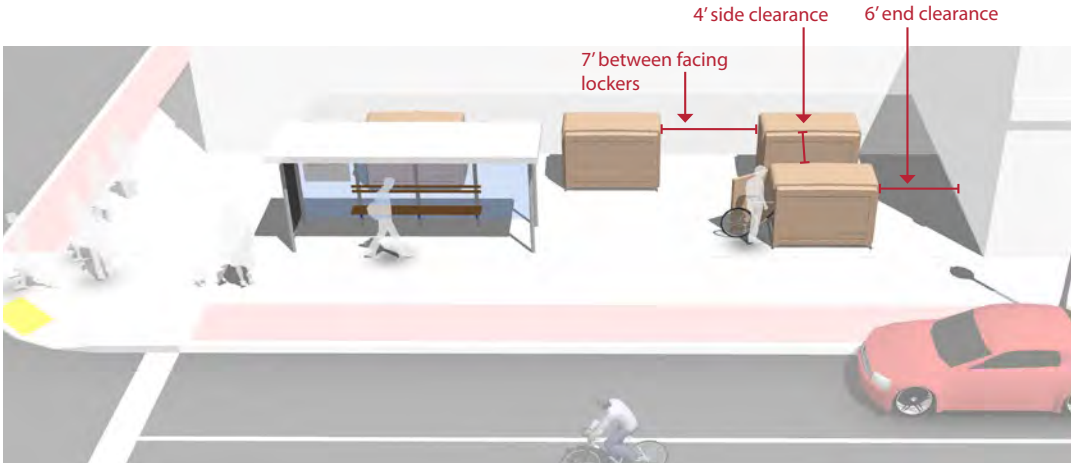
Description

Bicycle lockers are intended to provide long-term bicycle storage for employees, students, residents, commuters, and others expected to park more than two hours. Long-term facilities protect the entire bicycle, its components and accessories against theft and against inclement weather, including snow and wind-driven rain.

Bicycle lockers provide space to store a few accessories or rain gear in addition to containing the bicycle. Some lockers allow access to two users - a partition separating the two bicycles can help users feel their bike is secure. Lockers can also be stacked, reducing the footprint of the area, although that makes them more difficult to use.

Guidance

- Minimum dimensions: width (opening) 2.5'; height 4'; depth 6'.
- 4 foot side clearance and 6 foot end clearance.
- 7 foot minimum distance between facing lockers.
- Locker designs that allow visibility and inspection of contents are recommended for increased security.
- Access is controlled by a key or access code.



Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. Potential locations for long-term bicycle parking include transit stations, large employers, and institutions where people use their bikes for commuting and not consistently throughout the day.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
APBP. *Bicycle Parking Guide 2nd Edition.* 2010.

Materials and Maintenance

Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

5.11.4 SECURE PARKING AREAS (SPA)

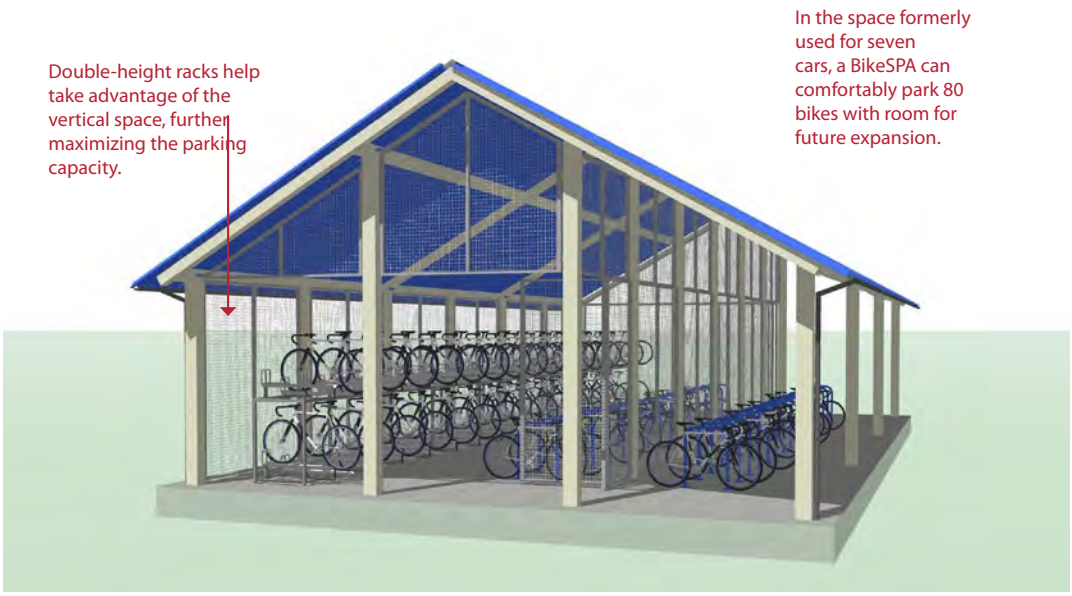
Description

A Secure Parking Area for bicycles, also known as a BikeSPA or Bike & Ride (when located at transit stations), is a semi-enclosed space that offers a higher level of security than ordinary bike racks. Accessible via key-card, combination locks, or keys, BikeSPAs provide high-capacity parking for 10 to 100 or more bicycles. Increased security measures create an additional transportation option for those whose biggest concern is theft and vulnerability.

Guidance

Key features may include:

- Closed-circuit television monitoring.
- Double high racks & cargo bike spaces.
- Bike repair station with bench.
- Bike tube and maintenance item vending machine.
- Bike lock "hitching post" – allows people to leave bike locks.
- Secure access for users.



Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. BikeSPAs are ideal for transit centers, airports, train stations, or wherever large numbers of people might arrive by bicycle and need a secure place to park while away.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
APBP. *Bicycle Parking Guide 2nd Edition.* 2010.

Materials and Maintenance

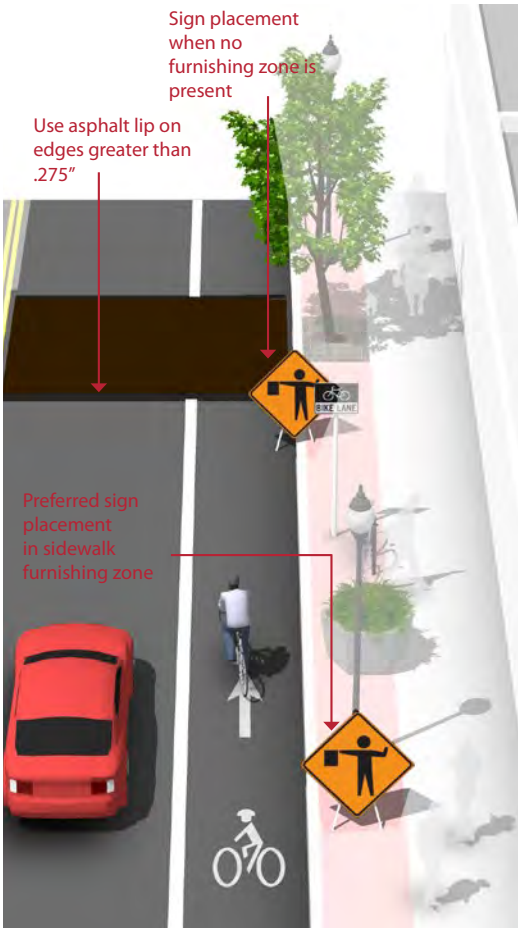
Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

5.11.5 BICYCLE ACCESS THROUGH CONSTRUCTION AREAS

Description

Wherever bicycles are allowed, measures should be taken to provide for the continuity of a bicyclist's trip through a work zone area. Bicyclists should not be led into conflicts with work site vehicles, equipment, moving vehicles, open trenches, or temporary construction signage.

Efforts should be made to re-create a bike lane (if one exists) to the left of the construction zone. If this is impossible, then consider the closure of a standard-width travel lane to accommodate bicycle travel.



Guidance

Construction Signage

- Place in a location that does not obstruct the path of bicyclists or pedestrians.
- Detour and closure signs related to bicycle travel may be included on all bikeways where construction activities occur. Signage should also be provided on all other roadways.

Bicycle Travel around Steel Grates

- Require temporary asphalt (cold mix) around plates to create a smooth transition.
- Use steel plates only as a temporary measure during construction, not for extended periods.
- Use warning signs where steel plates are in use.
- Require both temporary and final repaving to provide a smooth surface without abrupt edges.

Discussion

Plates used to cover trenches tend to not be flush with pavement and have a 1"-2" vertical transition on the edges. This can puncture a hole in a bicycle tire and cause a bicyclist to lose control. Although it is common to use steel plates during non-construction hours, these plates can be dangerously slippery, particularly when wet.

Contractors performing work should be made aware of the needs of bicyclists and be properly trained in how to safely route bicyclists through or around work zones.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
FHWA. *Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 21: Bicycle and Pedestrian Accommodation in Work Zones.* 2006.

Materials and Maintenance

Debris should be swept to maintain a reasonably clean riding surface in the outer 5 - 6 ft of roadway.

5.12 BIKEWAY MAINTENANCE

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flush, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities. The following recommendations provide a menu of options to consider to enhance a maintenance regimen.

Recommended Walkway and Bikeway Maintenance Activities

Maintenance Activity	Frequency
Inspections	Seasonal – at beginning and end of Summer
Pavement sweeping/ blowing	As needed, with higher frequency in the early Spring and Fall
Pavement sealing	5 - 15 years
Pothole repair	1 week – 1 month after report
Culvert and drainage grate inspection	Before Winter and after major storms
Pavement markings replacement	As needed
Signage replacement	As needed
Shoulder plant trimming (weeds, trees, brambles)	Twice a year; middle of growing season and early Fall
Tree and shrub plantings, trimming	1 – 3 years
Major damage response (washouts, fallen trees, flooding)	As soon as possible

This Section Includes:

- Sweeping
- Signage
- Roadway Surface
- Pavement Overlays
- Drainage Grates
- Gutter to Pavement Transition
- Landscaping
- Maintenance Management Plan


Sweeping


Roadway Surface


Gutter to Pavement Transition


Drainage Grates


Landscaping


Maintenance Management Plan

5.12.1 SWEEPING

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate .

5.12.2 GUTTER TO PAVEMENT TRANSITION

Description

On streets with concrete curbs and gutters, 1 to 2 feet of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating potholes and a rough surface for travel.

The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating a hazardous condition for bicyclists.

Guidance

- Ensure that gutter-to-pavement transitions have no more than a ¼" vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least 3 feet of pavement outside of the gutter seam.

5.12.3 ROADWAY SURFACE

Description

Bicycles are much more sensitive to subtle changes in roadway surface than are motor vehicles. Various materials are used to pave roadways, and some are smoother than others. Compaction is also an important issue after trenches and other construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel. Sometimes compaction is not achieved to a satisfactory level, and an uneven pavement surface can result due to settling over the course of days or weeks. When resurfacing streets, use the smallest chip size and ensure that the surface is as smooth as possible to improve safety and comfort for bicyclists.

Guidance

- Maintain a smooth pothole-free surface.
- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼".
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- If chip sealing is to be performed, use the smallest possible chip on bike lanes and shoulders. Sweep loose chips regularly following application.
- During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only. However, use caution when doing this so as not to create an unacceptable ridge between the bike lane and travel lane.

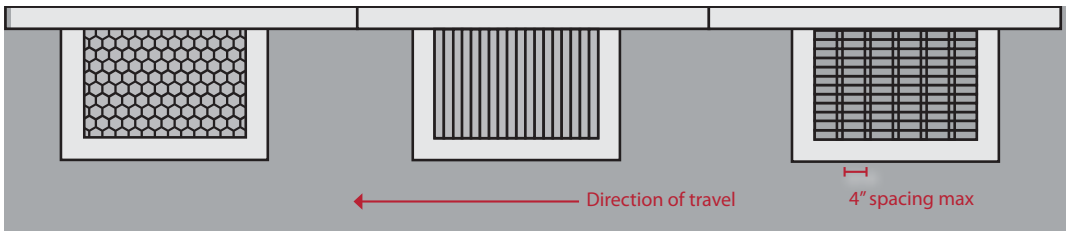
5.12.4 DRAINAGE GRATES

Description

Drainage grates are typically located in the gutter area near the curb of a roadway. Drainage grates typically have slots through which water drains into the municipal storm sewer system. Many older grates were designed with linear parallel bars spread wide enough for a tire to become caught so that if a bicyclist were to ride on them, the front tire could become caught in the slot. This would cause the bicyclist to tumble over the handlebars and sustain potentially serious injuries.

Guidance

- Require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats.
- Create a program to inventory all existing drainage grates, and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate should not be an acceptable alternative to replacement.



This page intentionally left blank.