REGIONAL ACTIVE TRANSPORTATION PLAN

prepared for

MCAG
MERCED COUNTY ASSOCIATION OF GOVERNMENTS

April 3. 2024

FEHR & PEERS

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Executive Summary

MCAG is taking strides in its efforts of building and maintaining safe and connected bicycle, pedestrian, and transit networks to meet the community's need to improve the existing roadway networks, reduce fatalities and serious injuries throughout the county, improve public health, and reduce dependency on single occupancy vehicles through the development of a comprehensive Regional Active Transportation Plan (ATP). Active transportation describes a means of getting around that is primarily powered by human energy, such as walking and bicycling. Throughout this document, all references to pedestrians are inclusive of persons with disabilities who use mobility aids (such as, scooters, manual and powered wheelchairs) to access public pedestrian walkways. Land use, the current state of the economy, institutionalized practices, and society can shape the active transportation experience. These factors play into the decision of how people travel: to get groceries, to go to school, to get to work, and to upkeep a healthy lifestyle.

This Plan is a regional document that takes a countywide look at the pedestrian and bicycle networks and how MCAG and its member agencies can support active transportation through education, equity, policy, and implementation. Walking and biking recommendations are made for the following jurisdictions in the region:

The cities of:

- Atwater
- Dos Palos
- Livingston
- Los Banos
- Merced

Larger unincorporated communities within Merced County:

- Delhi
- Hilmar
- Planada
- Santa Nella
- South Dos Palos
- Winton

The City of Gustine completed an Active Transportation Plan in 2021, the primary projects of which are included for reference.

This plan is structured to provide a guiding vision and set of goals, a comprehensive overview existing conditions for bicyclists and pedestrians, and specific projects, strategies, and actions to advance and encourage walking and bicycling.

- **Chapter 1: Vision and Guiding Principles** provides insight to the purpose and need for an Active Transportation Plan for Merced County, including the plan development process, as well as the overall vision and goals that grounds the Plan.
- **Chapter 2: Where the Region Stands** includes a summary of each of the jurisdictions existing bicycle and pedestrian infrastructure, major barriers in the network, an overview of bicycle and pedestrian related collision trends, and an overview of the presence of disadvantaged communities countywide and associated equity analysis.
- **Chapter 3: Engaging the Community** highlights the various outreach efforts and activities conducted to solicit feedback and input on the development of this plan.
- **Chapter 4: Active Transportation Toolbox** includes a primer on national best practices around design and policy, as well as infrastructure and non-infrastructure countermeasures
- **Chapter 5: Building Out a Regional Network** provides a list of recommended improvements for jurisdictions to consider for implementation. Each project was prioritized based on various considerations including feasibility, safety, access, equity, and connectivity.
- **Chapter 6: Implementation and Accountability** includes potential funding opportunities, how to track progress of enhancing the transportation network, and strategies for MCAG and its member jurisdictions to coordinate to create a safer, complete, and connected active transportation network.

Collectively, the recommended plans and policies in this document reflect a vision where people of all ages and abilities have access to safe, connected, and robust facilities for bicycling and walking.

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Vision and Guiding Principles

What we now consider “active transportation” is very different from when transportation was limited to walking and bicycling. Active transportation today also includes using a skateboard, electric bicycle or scooter, a wheelchair, or roller skates. Even when we drive or take transit, every trip we make begins and ends with active transportation.

The obligation for MCAG and its partner agencies is to build and maintain a transportation system that serves every person, helps the State reach its goals to improve public health, reduce dependency on single occupancy vehicles, and rectify historic discrimation inequity in land use decision-making. The Merced Regional Active Transportation Plan provides a foundation for the development and evolution of the local and regional active transportation network. As decision makers take on the task of preparing yearly budgets and identifying the critical needs of each partner agency, identifying and prioritizing active transportation needs is more crucial than ever. Ultimately, the purpose of this Plan is to improve the quality of life in Merced County for everyone – children, young adults, the elderly, people with disabilities, and future generations – through connecting the pedestrian and bicycle network and making travel safer, more convenient, and more comfortable.

Plan Purpose and Need

The Merced County Regional Active Transportation Plan is the blueprint for enhancing active transportation in the region. It is a combined pedestrian and bicycling plan which builds off previous projects and programs established through both local and regional plans. This ATP intends to:

- Identify and support how active transportation contributes to the County's health, environmental, economic, and land use goals
- Acknowledge and address the effects of infrastructure decisions on safety and mobility, with an emphasis in communities that have been historically underserved
- Provide decision makers with information in making policy decisions that affect people walking and biking
- Provide recommendations on where to invest in bicycle and pedestrian infrastructure

Embracing the Safe System Approach as part of this ATP aligns with the 2022 National Safety Strategy released by the US DOT,[1] and Caltrans' commitment with the most recent Strategic Highway Safety Plan. Committing to and providing a Safe System, especially for vulnerable road users, committing to providing a Safe System, especially for vulnerable road users, is a priority for the region.

Plan Development Process

The Plan was developed to serve as a resource for local agencies to plan and implement walking and biking improvements, and for MCAG to prioritize and implement improvements of countywide significance. The content of the plan and its recommendations were informed by several inputs:

- Adopted local plans
- Existing data related to walking and biking
- Identified barriers to walking, biking, and accessing transit through walk audits
- Benchmark on Safe System best practices and where challenges may exist
- Input from community members through a thorough engagement process

1 https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf

Establishing a Safe System Policy

Safe System Approach is an international, national, and state best practice framework, and a foundation for improving roadway safety. A Safe System acknowledges the vulnerability of the human body—in terms of the amount of kinetic energy transfer a body can withstand—when designing and operating a transportation network to minimize serious consequences of crashes. According to the World Health Organization, the goal of a Safe System is to ensure that if crashes occur, they "do not result in serious human injury."

The MCAG Local Roadway Safety Plan also acknowledges the Safe System approach. Through these two plans, MCAG and its member agencies are committing to addressing safety problems, and identifying and facilitating changes that need to be implemented to create a safer environment for pedestrians and bicyclists.

MCAG and its member agencies can adopt a Safe System Policy, which would commit them to, as a matter of policy, prioritize the safety of vulnerable users over multimodal operations in instances where a tough trade-off decision between the two is necessary. This can work to ensure a safe and equitable roadway network.

Priorities

Prioritizing walking, bicycling, and transit allows people to get to and from their jobs, schools, retail centers, recreational areas, and all around the community. Facilitating an increase in active transportation can confer a variety of benefits such as improved safety, comfort, health, air quality, economic vitality, and quality of life. Increased walking and bicycling will also support the region's commitments to state climate goals, including the reduction of vehicle miles traveled (VMT).

Benefits of Active Transportation

Walking, biking, and other forms of active transportation are integral to the health of individuals and communities. The benefits of active transportation include:

- Connecting people to schools, retail, recreational, and transit centers, jobs, and other members of the community
- Improving health and reducing the incidence of disease and obesity
- Reducing air pollution and greenhouse gas production
- Supporting local businesses and economic vitality
- Creating more vibrant and lively streets
- Saving people money on gas and car maintenance

Health

In recognition of the importance of physical activity for health, the United States Surgeon General and the Centers for Disease Control (CDC) encourage communities to design streets to make walking and biking safe and easy.[2] Using active modes of transportation is a low-cost and effective way to incorporate physical activity into daily routines. Benefits to both physical and mental health from moderate amounts of daily exercise include lowered risk of heart disease, adult-onset diabetes, high-blood pressure, and stress, as well as more energy, flexibility, and muscle strength. Physical activity can also help combat obesity and lower asthma rates.

This advice is pertinent to Merced County, where health outcomes rank poorly compared to statewide indicators on a number of fronts. Merced County has higher obesity rates for both adults and children than statewide and nationwide averages, with children in particular being significantly less likely to be physically active. In terms of diabetes, Merced County has the highest age-adjusted death rate for diabetes in the San Joaquin Valley, and the fifth-highest amongst California counties. Merced County also sees a higher prevalence of chronic lower respiratory diseases like asthma than statewide averages.[3]

Equity

Active transportation gives people who cannot or choose not to drive more and affordable options for getting around independently to meet their daily needs. Those who benefit most from improvements to walking and biking include children (particularly for going to school); many seniors and people with disabilities; and low-income families, for whom the cost of owning and operating a car can be prohibitive

Economy

Active transportation can benefit the bottom line of households, businesses, and cities. The economic benefits of walking and biking include lower transportation costs for individuals and families, increased property values in traffic-calmed neighborhoods, savings to cities from less wear and tear on streets, less demand for roadway improvements and parking lots, and a greater ability for communities to attract new residents and employers. .

Livability

Enabling people to make shorter trips on foot or by bicycle can help communities improve quality of life in important ways. More trips out of the car shifted to walks and bike rides leads to more interaction with neighbors. Local streets become calmer and safer, but also livelier with the increased presence of pedestrian and bicyclists activity. The most discussed, and perhaps most critical, environmental benefits of active transportation are reduced air pollution and emissions of greenhouse gases. Other environmental benefits include energy savings, less noise pollution, less water pollution, and even reduced pressure to develop agricultural and open space.

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2 Centers for Disease Control (CDC), "The 3 D's: Design. Develop. Deliver." Retrieved from https://www.cdc.gov/physicalactivity/inactivity-among-adults-50plus/infographic.pdf

3 "Merced County 2023 Community Health Assessment." Retried from https://www.countyofmerced.com/DocumentCenter/View/12213/Merced-County-Community-Health-Assessment.

Vision

> *The Merced Region is a place where people of all ages, abilities, and backgrounds can safely, conveniently, and comfortably walk, bike, and roll to wherever their destinations may be. The active transportation system promotes healthy communities, improved quality of life, and equitable access to job and educational opportunities.*

Guiding Principles

Safety

Create and maintain a safe environment for people walking, biking, and rolling

Mode Shift

Increase the share of trips made using active modes throughout the region

Equity

Prioritize active transportation investments in underserved communities

Connectivity

Create a pedestrian and bicycle network that connects people to key destinations and public transit

Relevant Plans

The following is a review and analysis of existing policies and programs at the state and local levels. These plans and documents contain goals and policies as well as specific requirements related to active transportation. The following summarizes the plans and identifies how they will support the efforts of this ATP.

State Plans and Policies

Caltrans District 10 Active Transportation Plan (2021)

The District 10 Active Transportation Plan identifies needs on the State Highway System and establishes a baseline for assessing future progress by focusing on four goals: mobility, safety, equity, and preservation.

This Plan supports the District 10 ATP by building off its existing conditions, identifying walking and bicycling needs, and funding to meet active transportation needs.

Caltrans Complete Streets Evaluation Policy (2021)

The Caltrans Complete Streets Evaluation Policy focuses on providing comfortable, convenient, and connected complete streets facilities for people walking, biking, and taking transit or passenger rail unless an exception is documented and approved.

Regional Plans

Regional Transportation Plan (RTP) / Sustainable Communities Strategy for Merced County (SCS) (2022)

The RTP/SCS seeks to ensure that the Merced County transportation system will continue to operate efficiently over the next 25 years with sufficient capacity to meet demand and that mobility options are available for all of Merced County's residents.

Merced County Regional Bicycle Transportation Plan (2008)

The purpose of MCAG's Merced County Regional Bicycle Transportation Plan is to provide a comprehensive long-range view for the development of an extensive regional bikeway network that connects cities and unincorporated areas countywide.

Local Plans

Relevant local plans were reviewed to consider strategies for developing a complete and connected walking and bicycling network that promotes walking and bicycling access and safety. This ATP aims to link ideas from local plans and align with them in both incorporated and unincorporated areas; however, it is the responsibility of each jurisdiction to fully implement their respective plans. Plans reviewed include the Gustine Active Transportation Plan (2022), City of Merced Active Transportation and Safe Routes to School Plan (2019), City of Los Banos Bicycle Pedestrian Plan (2018), Planada Pedestrian Improvement Plan (2014), Franklin-Beachwood Safe Routes to School Plan (2014), City of Merced Bike Transportation Plan (2013), and City of Livingston Bicycle Plan (2005).

Relevant Regional and Local Policies

In recent years, communities across the region have adopted policies related to active transportation.

Notable policies at the county level include:

- *MCAG's Regional Transportation Impact Fee* enacted in 2005 provides additional revenue to mitigate transportation impacts on the regional road network.
- *Measure V* is MCAG's 30-year 1/2 cent transportation sales tax for the Merced County region that was passed by voters in November 2016. The measure is estimated to generate $15 million in new revenue annually and $450 million over the life of the measure. The Expenditure Plan requires jurisdictions spend at least 20% of their funding on alternative modes projects for biking, walking, and other alternative modes to single-occupant vehicle use.
- *MCAG's Regional Transportation Plan/ Sustainable Communities Strategies for Merced County (RTP/SCS, 2022)* identifies policies to support a regional transportation system and build out pedestrian and bicyclist facilities where they do not currently exist. Many of the RTP/SCS goals align with state regulatory frameworks, including the California Complete Streets Act (AB1358). The RTP/SCS policies focus on actively pursuing funding for active transportation projects countywide.
- *The 2030 Merced County General Plan (2013)* identifies policies to design an efficient transportation network, promote alternative modes of transportation, and develop Complete Streets improvements to support multimodal travel. The General Plan requires all new or major reconstructed streets within Urban Communities to accommodate travel by pedestrians and bicyclists, and coordinating bicycle lane standards, active transportation amenities, and funding between the County's incorporated and unincorporated communities.
- MCAG's Regional Bicycle Transportation Plan (2008) includes strategies and policies to connect bikeways throughout the county.

Notable policies at the local level include:

- *The City of Merced's Bicycle Transportation Plan (2013)* establishes a comprehensive system of Complete Streets policies to address all modes of transportation. Policies are tailored to design streets consistent with circulation function, transit-oriented development, or site design that promotes walking, bicycling, and transit usage. The Complete Streets policies are revisited in the City of Merced's Active Transportation and Safe Route to School Plan in 2019.
- *The City of Gustine's Active Transportation Plan (2021)* includes a policy to integrate bicycle and pedestrian network and facility needs into city planning documents and capital improvement projects where applicable. In order to do so, the plan recommends adopting a Complete Streets resolution or ordinance as a commitment to developing bicycle and pedestrian facilities throughout the City.
- *The City of Los Banos Bicycle Pedestrian Plan (2018)* uses the City's 2030 General Plan as its basis for transportation goals. Tiering off of the General Plan, the City aims to incorporate Complete Streets policies into local planning efforts.


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Where The Region Stands

Merced County encompasses over 1.2 million acres, with 81 percent of available land dedicated to agricultural uses and populations concentrated throughout six incorporated cities and numerous unincorporated communities. While the region's population remains under 300,000, the MCAG 2022 Regional Transportation Plan estimates the County will increase by approximately 82,000 persons, 27,000 jobs, and 34,000 households by 2046.

A growing population needs a robust transportation network to support all modes of travel. Today, driving remains the primary and main mode choice for many residents. At the countywide level, only 2.3 percent and 0.4 percent of the population walks and bikes to work, respectively. This reflects the existing regional transportation system, which has historically prioritized vehicles over the safety, comfortability, and accessibility for bicyclists and pedestrians. Understanding the conditions of the transportation network and barriers provides insight on potential countermeasures that can be used to mitigate connectivity and safety issues in the network.

This chapter provides information on the current state of bicycling and walking through a discussion of the existing facilities, barriers to travel, collision data, and disadvantaged community metrics.

Existing Facilities

Safe and connected active transportation facilities promote the mode shift from vehicles to walking and bicycling and provide the first- and last-mile connection from transit facilities to destinations such as retail centers, work, school, parks, and many more facilities. When developing an Active Transportation Plan for such a large geographical area, the active transportation landscape can vary significantly for each unincorporated community. For instance, the transportation needs of more densely populated areas, such as the City of Merced, differ from those of lower-density or more rural communities, such as Planada in unincorporated Merced County. Therefore, understanding user needs is a nuanced process that must take local context and land use (as documented in **Appendix A**) into consideration.

Multimodal facilities primarily consist of sidewalks, trails, multi-use paths, and bicycle facilities. Multimodal facilities support people walking, biking, and all other non-motorized modes of travel. Currently, Merced County has approximately 42.1 miles of multi-use paths and 108.3 miles of roadway with designated bicycle facilities, as listed in **Table 2**. While the exact length of existing sidewalks is unavailable, sidewalks are provided in most new developments but are intermittent or missing in many older neighborhoods and rural communities.

Bicycle Facilities

Several types of bikeways and supporting facilities come together to form a complete bicycle network.

Bicycle parking requirements are provided in various City and County development codes. While bike parking is installed at most municipal buildings and schools, these facilities in some instances do neet meet the standards or quality that residents expect.

Bikeways are classified in Chapter 1000 of the Highway Design Manual (Caltrans, 2015) into four primary types:

- Class I bike paths (including shared-use paths and trails)
- Class II bike lanes (including Class IIB buffered bike lanes)
- Class III bike routes (including Class IIIB bicycle boulevards)
- Class IV separated bikeways

Bicycle facilities throughout the region are mapped in **Figures 5-10**.

Table 2
Existing Bicycle Facilities in Merced County by Facility Type

Facility Type	Mileage
Class I shared-use paths	42.1
Class II bike lanes	69.1
Class III bike routes	39.2
Class IV separated bikeways	0

Class I Shared-Use Path

Bike Paths, often referred to as shared-use paths or trails, are off-street facilities that provide exclusive use for nonmotorized travel, including bicyclists and pedestrians, as shown in **Figure 1**. Bike paths have minimal cross flow with motorists and are typically located along landscaped corridors. Bike paths can be utilized for both recreational and commute trips. These paths provide an important recreational amenity for bicyclists, pedestrians, dog walkers, runners, skaters, and those using other nonmotorized forms of travel. They are frequently designed to offer a benefit to users, such as a connection not previously included in the bicycle or pedestrian network or traversing a barrier such as a freeway or river. Unless specifically allowed by local laws, equestrians are generally prohibited from using bike paths. If horses and riders are allowed to use the facility, paths should be designed to accommodate all users, typically with wider widths than traditional multiuse paths.

Class I bike paths currently exist in a few locations in the county, typically alongside canals or waterways or adjacent to busier roadways. In Los Banos, Class I bike paths run along portions of the Main Canal, Prairie Springs Drive, and Ward Road. In Gustine, Class I bike paths run along Meredith Avenue to Harry Schmidt Park. In Atwater, Class I bike paths run along N Buchach Road and E Juniper Avenue. The City of Merced and its surrounding areas have the most robust Class I bike path network in the County, with facilities along Black Rascal Creek, Fahrens Creek, Bear Creek, and Cottonwood Creek. Class I paths also exist along Lake Road and Campus Parkway.

Figure 1
Class I shared-use paths on either side of a large arterial

Figure 2
Class IIB buffered bike lanes along a three-lane collector

Class II Bike Lane & Class IIB Buffered Bike Lane

Class II bike lanes are on-street facilities that use striping, stencils, and signage to denote preferential or exclusive use by bicyclists. On-street bike lanes are located adjacent to motor vehicle traffic. Well-designed bike lanes provide adequate space for comfortable riding and alert drivers about the predictable movements of bicyclists. The majority of existing bicycle facilities throughout the region are categorized as Class II bicycle lanes, with most located in the urbanized areas of Los Banos and Merced.

Class IIB, or buffered bike lanes, are standard bike lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane, as shown in **Figure 2**. This type of bikeway provides greater distance between vehicles and bicycles, space for bicyclists to pass each other, and greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane; and encourages bicycling by contributing to the perception of safety.

Figure 3
A neighborhood residential street designated as a Class IIIB bike boulevard

Class III Bikeways: Bike Route and Bike Boulevard

Bike routes are streets with signage and optional pavement markings where bicyclists travel on the shoulder or share a lane with motor vehicles. Class III bike routes are best suited for low-speed and low-volume streets, to connect bike lanes or paths along corridors that do not provide enough space for dedicated lanes. Shoulders are preferable but not required on streets with Class III bike routes.

Bicycle boulevards, as shown in **Figure 3**, are designated in this Plan as Class IIIB. They are similar to bike routes in that they are routes shared with automobile traffic. They are located on low-speed and low-volume streets, such as those found in residential neighborhoods, and can close important gaps in the bicycle network on roads with insufficient space for dedicated lanes. Bicycle boulevards are distinct from typical bike routes in that further enhancements are provided to slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables. Bicycle boulevards can also feature special wayfinding signage to nearby destinations or other bikeways.

Most bicycle routes run throughout the City of Gustine and in the City of Merced providing connections to Class II bike lanes.

Class IV Separated Bikeway

Class IV separated bikeways, commonly known as cycle tracks, are physically separated bicycle facilities that are distinct from the sidewalk and designed for exclusive use by bicyclists. They are located within the street right-of-way but provide comfort similar to Class I bike paths.

The key feature of a separated bikeway, as shown in **Figure 4**, is a vertical element that provides further separation from motor vehicle traffic. Common vertical elements used for separation include a vertical curb, a painted buffer with flexible posts, parked cars, a landscaped area, large planters, or a fixed barrier. Separated bikeways may also be constructed by creating a bike lane at a height above the vehicular lanes. Separated bikeways can be either one-way or two-way, accommodating a single direction of travel or both. No Class IV separated bikeways currently exist in the region.

Figure 4
Class IV separated bikeways, featuring plastic bollards installed in a painted buffer, running along a five-lane arterial

Figure 5
Existing Bicycle Network
Los Banos

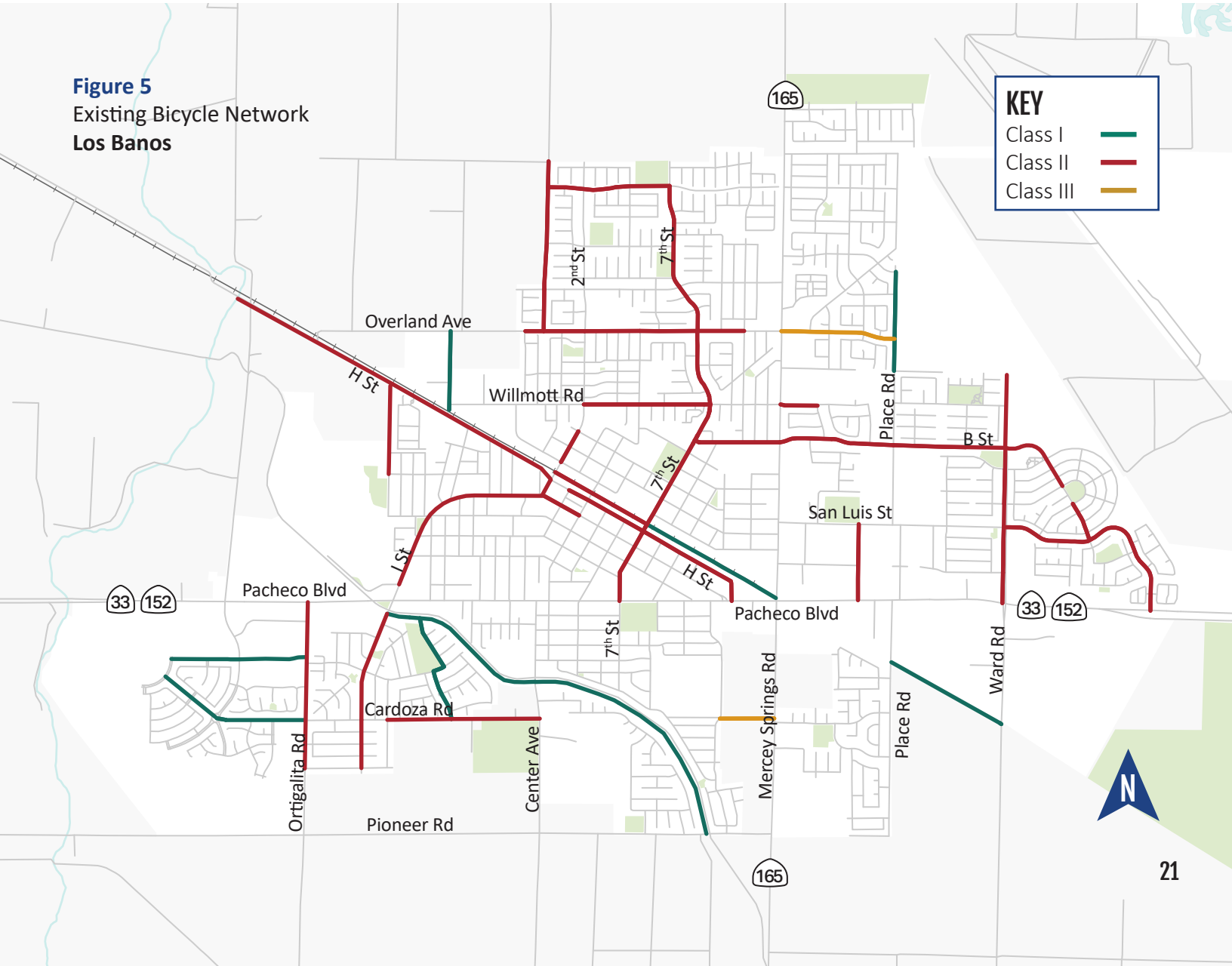
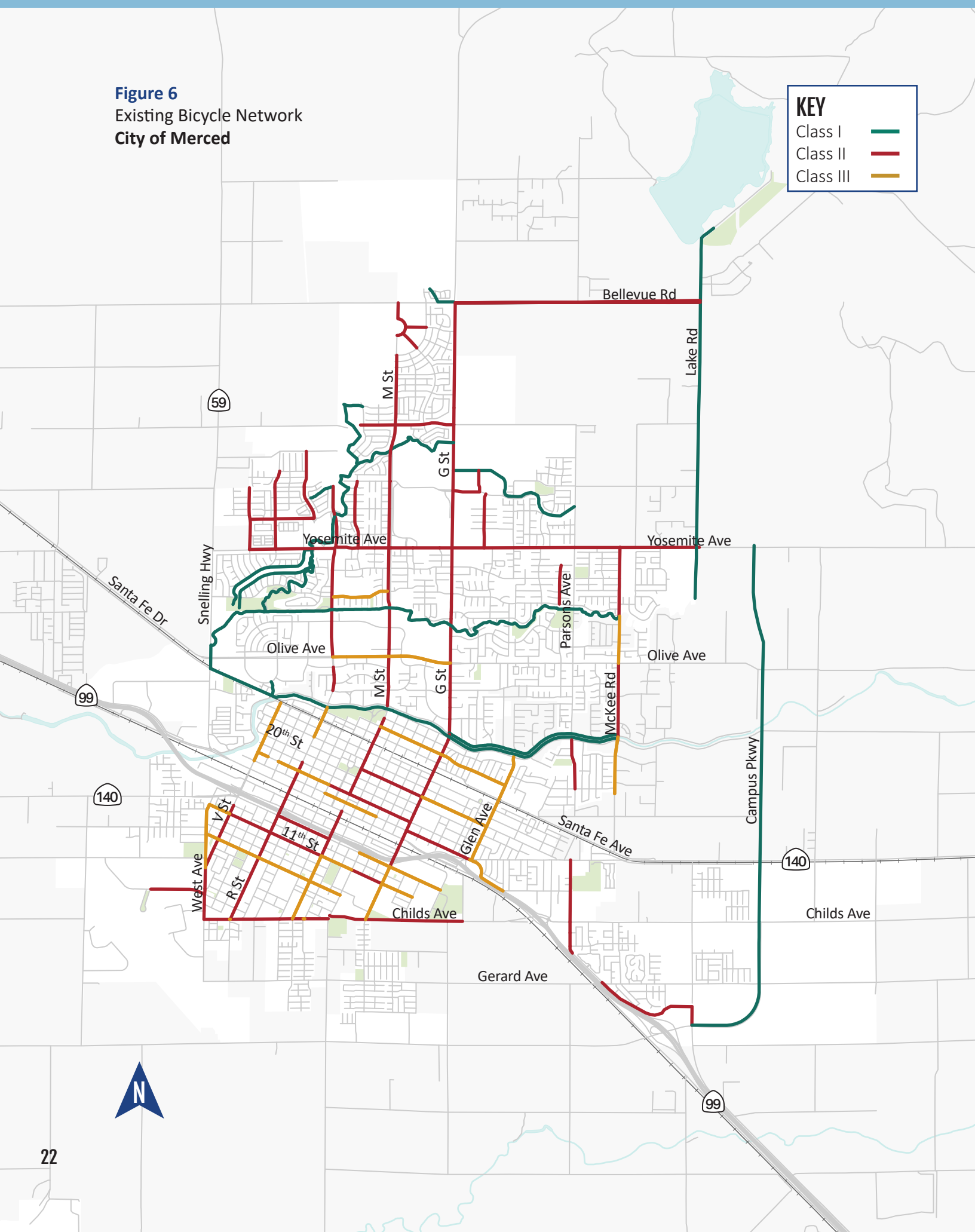


Figure 6
Existing Bicycle Network
City of Merced



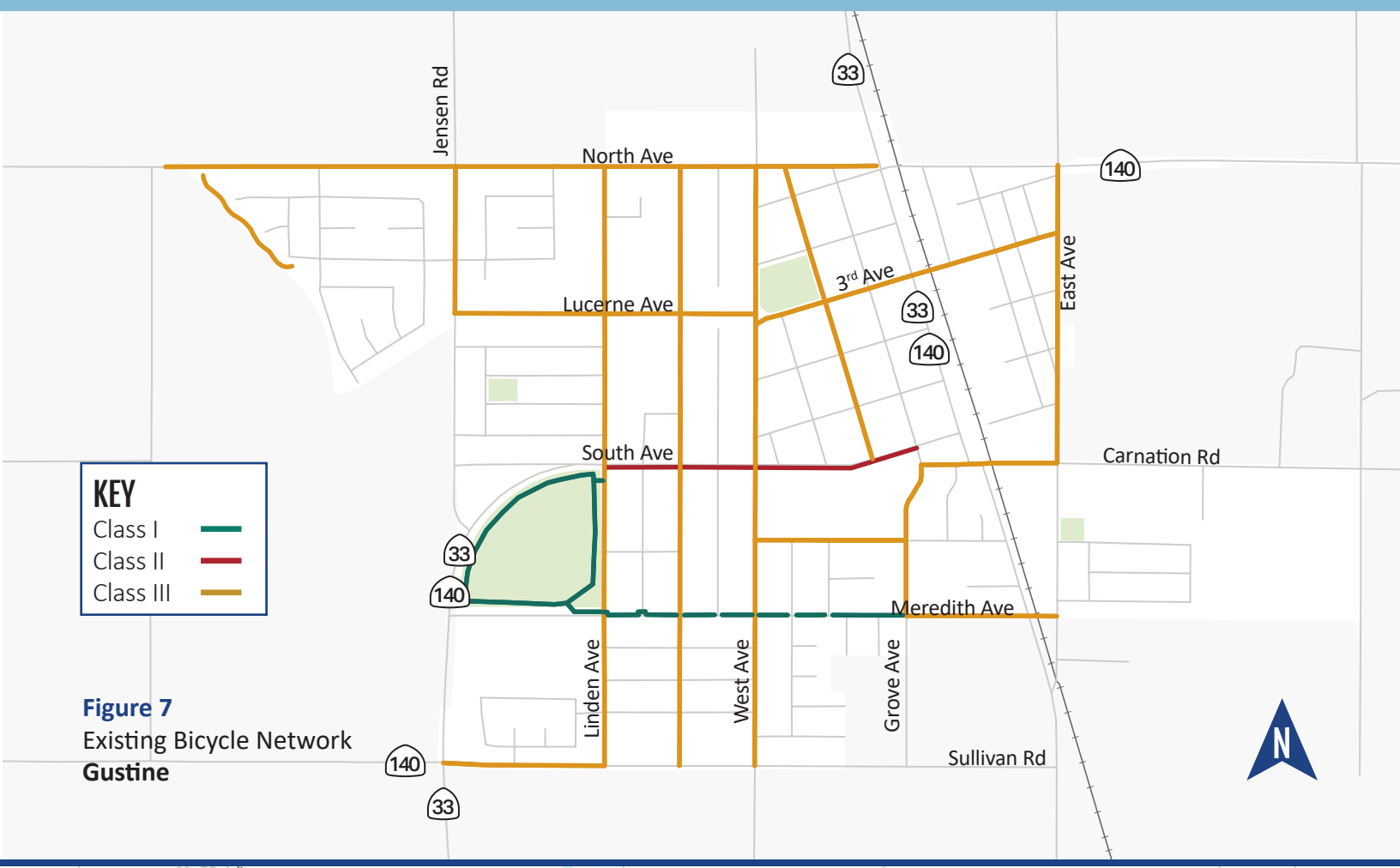


Figure 7
Existing Bicycle Network
Gustine

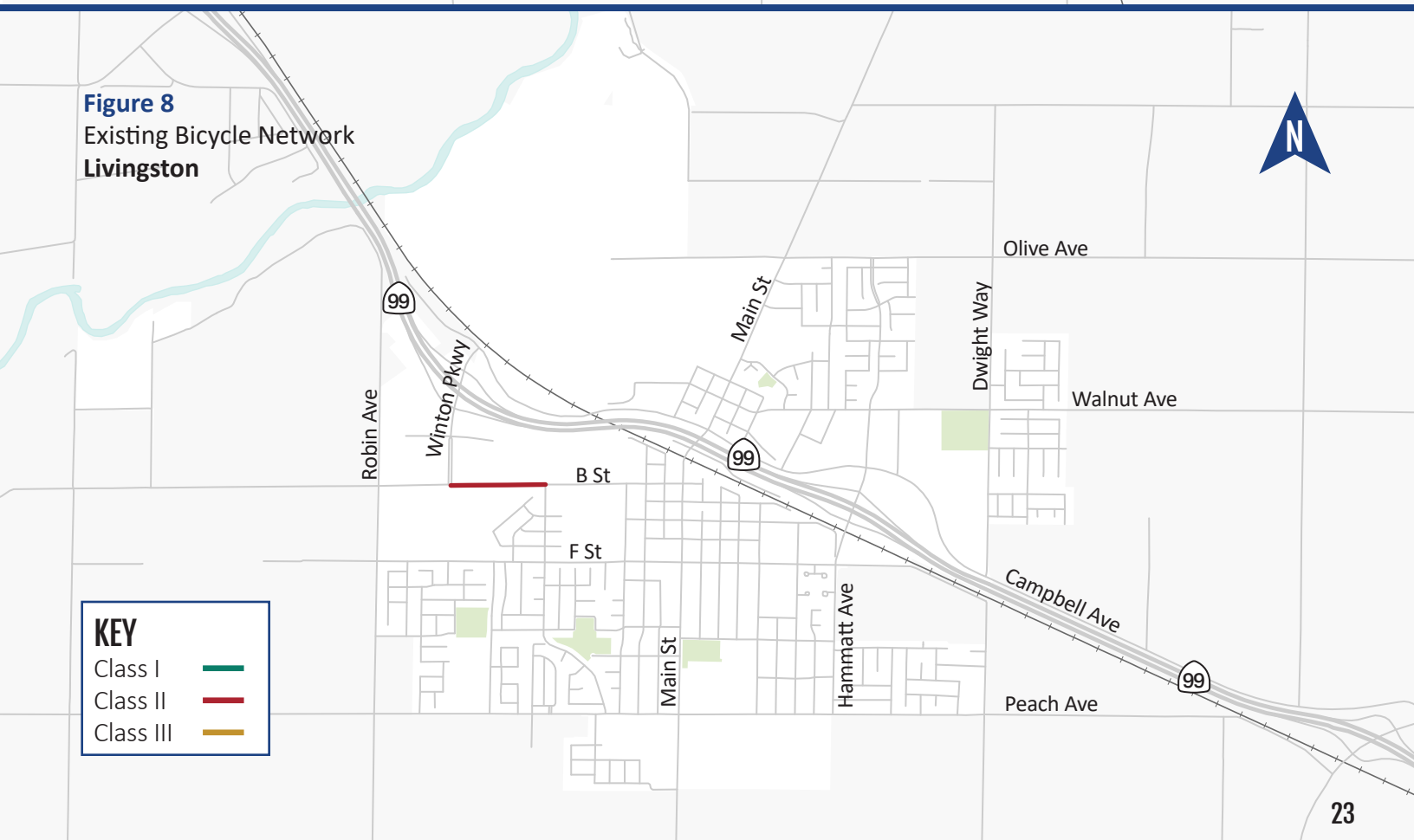


Figure 8
Existing Bicycle Network
Livingston

Figure 9
Existing Bicycle Network
Atwater and Winton

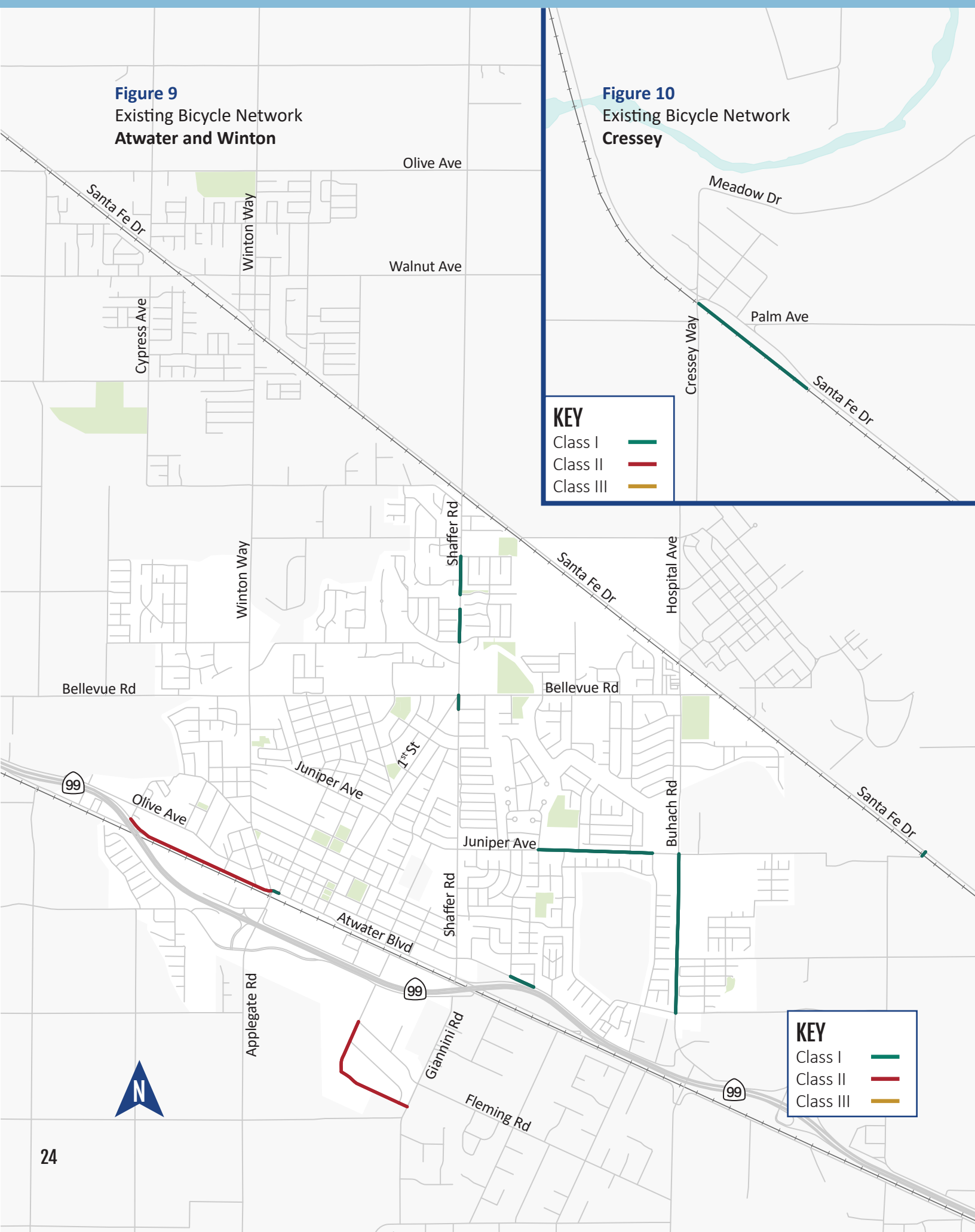


Figure 10
Existing Bicycle Network
Cressey

Pedestrian Facilities

Pedestrian facilities provide connections for those rolling and traveling by foot, and include shared-use paths and trails, sidewalks, and crosswalks.

Class I bikeways, discussed previously, are also used by pedestrians, and thus frequently known as shared-use paths or multi-use trails.

Sidewalks are paved areas immediately adjacent to the vehicular right-of-way for the exclusive use of pedestrians and may be used by people riding bicycles unless prohibited. Unlike shared-use paths, they are directly adjacent to the main right-of-way. As with trails, shade is important to encourage walking in Merced County's hot summer climate.

A legal crosswalk, whether marked or unmarked, in California is designed as the extension of the sidewalk as a desire line across the road at an intersection. Marked crosswalks feature striping and other enhancements to delineate a street crossing for pedestrians. There are two types of marked crosswalks:

- *Controlled crosswalks* are located at intersections with stop signs or traffic signals. They provide the most protection for pedestrians since they require drivers to come to a complete stop for to people in the crosswalk. Sharks teeth, or yield markings, are often installed before a marked crossing without stop control to notify motorists to stop and yield to pedestrians. Opportunities for enhancement may include adding pedestrian countdowns during the "Flash Don't Walk" signal phase; providing the walk phase during each signal cycle without having to press the push button (also referred to as "pedestrian recall"); prohibiting right turn on red; and automatically giving pedestrians a leading pedestrian interval (LPI) at crossings.
- *Uncontrolled crosswalks* are located at intersections without stop signs or traffic signals. In some cases, uncontrolled crosswalks are also found in the middle of a larger block to provide quicker access between streets. Under California law, drivers are legally required to yield to pedestrians at uncontrolled crosswalks.

Gaps in sidewalks, missing links in the bikeway network, and missing crosswalk links are commonplace in Merced County and pose significant challenges and barriers to active transportation.

Connectivity Across Other Modes

Wayfinding

Wayfinding provides orientation and spatial relationships for users, particularly bicyclists and pedestrians. While there are a handful of wayfinding signs in the City of Merced's downtown core, wayfinding signage is scarce in the rest of Merced County.

Roadway Network

Merced County is served by a multimodal transportation system that incorporates roadways, railways, airports, pedestrian and bicycle facilities to aid in the movement of people and goods throughout the region. Interstate 5 (I-5) and State Route 99 (SR 99) provide the primary connection to major cities within the region and link the county to other parts of California and beyond. Other state highways in the County include SR 33, SR 140, SR 152, and SR 165.

Merced County contains a mix of roadway types that vary in right-of-way, number of travel lanes, median type, design speed, and bicycle and pedestrian infrastructure. The Transportation and Circulation Element in the County General Plan identifies all major roadways that provide connections throughout the County.

SR 99 is the primary limited-access highway serving most of Merced County, directly serving the communities of Delhi, Buhach, Franklin, and the Cities of Atwater, Livingston, and Merced. However, for the communities that it serves, SR 99 also bisects them and acts as a physical barrier between neighborhoods. Freeway crossings are infrequent, and the crossing points that do exist are often at interchanges featuring heavy, fast-moving traffic as well as complex intersection geometries and traffic patterns, all of which pose safety risks, especially for bicyclists and pedestrians.

In addition to SR 99, the region is connected by many arterials that serve large volumes of traffic, often at high speeds. Some of these are state routes controlled by Caltrans, while other roads are controlled by Merced County or local jurisdictions. In addition to serving as regional connectors, these roads also pass through cities and towns around the County, where they sometimes also serve as main streets in city business districts. When passing through these districts, the roads serve pedestrians, bicyclists, and local vehicle traffic as well as traffic moving between communities. While posted speed limits on arterial roadways are generally lower when they pass through cities and towns, actual observed speeds and traffic volumes are nonetheless high, which pose safety risks. In addition, because they are often designed to prioritize high volumes of through traffic, they often do not feature sufficient crossing facilities in terms of quantity and frequency or quality. Careful design is required to ensure that these roads serve all users, are safe for all users, and do not serve as a barrier to bicyclists and pedestrians.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Transit

A well-planned bicycle and pedestrian network can facilitate transit use by supporting access to transit routes and creating first- and last-mile connections between transit stops and destinations. However, as a result of the barriers present in the roadway network, significant obstacles exist for accessing transit stations and stops in Merced County, with the active transportation network leading to and from transit services facing many of the same issues facing roadways countywide. The robust roadway network, critical for travel and goods movement, likewise creates challenges in connectivity.

Transit service is provided via both bus and rail within the region.

Bus

The Bus, Merced's Regional Transit System, is the single public transportation service provider for all of Merced County. The Bus operates on 15 fixed-route lines and two deviated fixed routes throughout the region and provides paratransit service for qualifying individuals who cannot access the fixed-route service. The Bus fixed route services operate from 6:00 a.m. to 8:00 p.m. Monday through Friday, and from 8:00 a.m. to 6:00 p.m. on weekends.

The Bus also operates "The Micro Bus" an on-demand microtransit service providing local rides within the communities of Dos Palos, Los Banos, Santa Nella, and Gustine. Users can make a reservation via a dispatch phone number, website, or The Micro Bus application on smartphones. The Micro Bus operates from 6:00 a.m. to 7:30 p.m. Monday through Friday, and from 8:00 a.m. to 5:30 p.m. on weekends.

In addition to The Bus, there are other transit providers in the area providing connections to Yosemite Park. These operators include the Yosemite Area Regional Transportation System (YARTS), VIA Trailways, and Greyhound.

Rail

Passenger rail service is currently provided by Amtrak on the San Joaquins route, which connects the City of Merced on a route that runs from Bakersfield to Stockton, with connecting services via transfer to Los Angeles, Sacramento, and the Bay Area. The San Joaquins run seven days a week, with six trains in each direction.

In addition to passenger rail operated by Amtrak, various freight railroads run through Merced County, including the Union Pacific Railroad (UP), California Northern Railroad (CFNR), and BNSF Railway currently operate within the region. Most of the railroad crossings in the County are at-grade, and at-grade rail crossings can pose significant barriers for bicyclists and pedestrians. They may have a hard time navigating at-grade crossings not designed with bicycle and pedestrian accessibility in mind, such as those missing key features such as sidewalks. Furthermore, with increases in freight traffic and, in particular, lengths of freight trains, at-grade rail crossings can often be blocked for significant lengths of time, which can pose obstacles for travel and make rail lines barriers in the communities they pass through.

The development of passenger rail in the region is poised for significant future investment through the expansion of the Altamont Corridor Express (ACE) train service into Merced County from the north, and California High Speed Rail (HSR) from the south. ACE will establish service via new stations in Livingston, Atwater, and Merced. The Merced Station will also be utilized by HSR through a proposed elevated track facility.

While increasing investments in passenger rail will come with many benefits for mode choice, proper accommodations for pedestrians and bicyclists will be necessary at proposed double-tracked rail lines and new station locations to avoid the creation of additional crossing and accessibility barriers.

Canals and Waterways

Merced County is crisscrossed by a network of waterways and irrigation canals. While they are critical to the region's agricultural industry, the canals that cover much of Merced County often suffer from insufficient crossings – the same issues as the region's freeways. Moreover, many crossings that do exist are narrow and lack sufficient bicycle and pedestrian infrastructure, and erosion and environmental are also factors in the long-term durability of existing facilities, such as the Bear Creek Trail in the City of Merced. Many of the existing irrigation canals are already used informally as walking routes, such as in the City of Dos Palos as a connection to O'Banion Park. Formalizing additional paths along canals may present an opportunity to expand the trail network if thoughtfully developed to accommodate both agricultural and transportation uses.

Mode Share and Trip Lengths

The American Community Survey (ACS) collects statistics on Means of Transportation to Work for every Census geography level larger than a block. This dataset estimates the local share of home-based work travel for workers 16 years and older by foot and bike as well as other modes. Because the ACS only polls a representative sample of residents in each geography per year (on average, about 1% of the local population), its metrics are bounded by a margin of error. This analysis only refers to the ACS mode share metrics at the county level, city level, and unincorporated community ("Census-designated place (CDP)") level, where sample sizes are large enough and margins of error small enough for reasonably precise analysis. The ACS Means of Transportation to Work dataset is undoubtedly useful for understanding home-based work commute mode share in residential areas, but it is less appropriate for estimating active mode share for all trip types and beyond residential areas. For example, the ACS metrics will fail to reflect recreational active travel in rural areas, active travel by students from homes to schools, and work-related active travel to residential areas by domestic workers.

Commute Mode Choice

As seen in **Table 3**, the walk and bike mode share for most communities is relatively small, in the range of zero to three percent. The majority of residents, 82.7%, commute by car each day.

Zero Vehicle Households

The choice to walk or bike may be impacted by whether a household has a vehicle available for trips. If a household has two commuters but one vehicle, one of the commuters must find another mode of transportation to work unless the household carpools. In Merced County, most households have at least two vehicles available. Approximately 49.4 percent of households have over three vehicles available while only 2.6 percent do not have any vehicles available.

Table 3 Means of Transportation to Work (2022 5-Year Average)

Location	Total Population of Workers	Walk		Bike		Drive Alone	
		#	%	#	%	#	%
Merced County (As A Whole)	106,381	2,481	2.3%	396	0.4%	92,217	87.2%
Merced County (Unincorporated)	20,514	446	2.2%	0	0%	17,481	87%
Merced County (Cities)	72,109	1,028	1.4%	391	0.5%	63,069	87.6%

Source: US Census Bureau American Community Survey (ACS) 2018-2022 5-Year data

Level of Traffic Stress in Bicycle Facilities

Cities and counties around California and nationwide are using a "level of traffic stress" (LTS) analysis to help determine the comfort of bicycling in their communities. An LTS analysis takes different travel corridor characteristics into consideration, including the number of travel lanes, speed of traffic, number of vehicles, presence of bike lanes, width of bike lanes, and presence of physical barriers providing protection from traffic. Based on these variables, a bicycle facility can be rated with an LTS ranging from 1 to 4.

The most comfortable (least stressful) facilities are given an LTS 1 rating. Facilities with this rating are typically shared-use paths, separated bikeways, low-volume and low-speed bike routes, and bike lanes on calm and narrow streets. The most stressful (least comfortable) facilities are given an LTS 4 rating. Facilities with this rating are typically major arterials with multiple lanes of traffic (with or without bicycle lanes in some cases, depending on speeds) or narrower streets with higher speed limits.

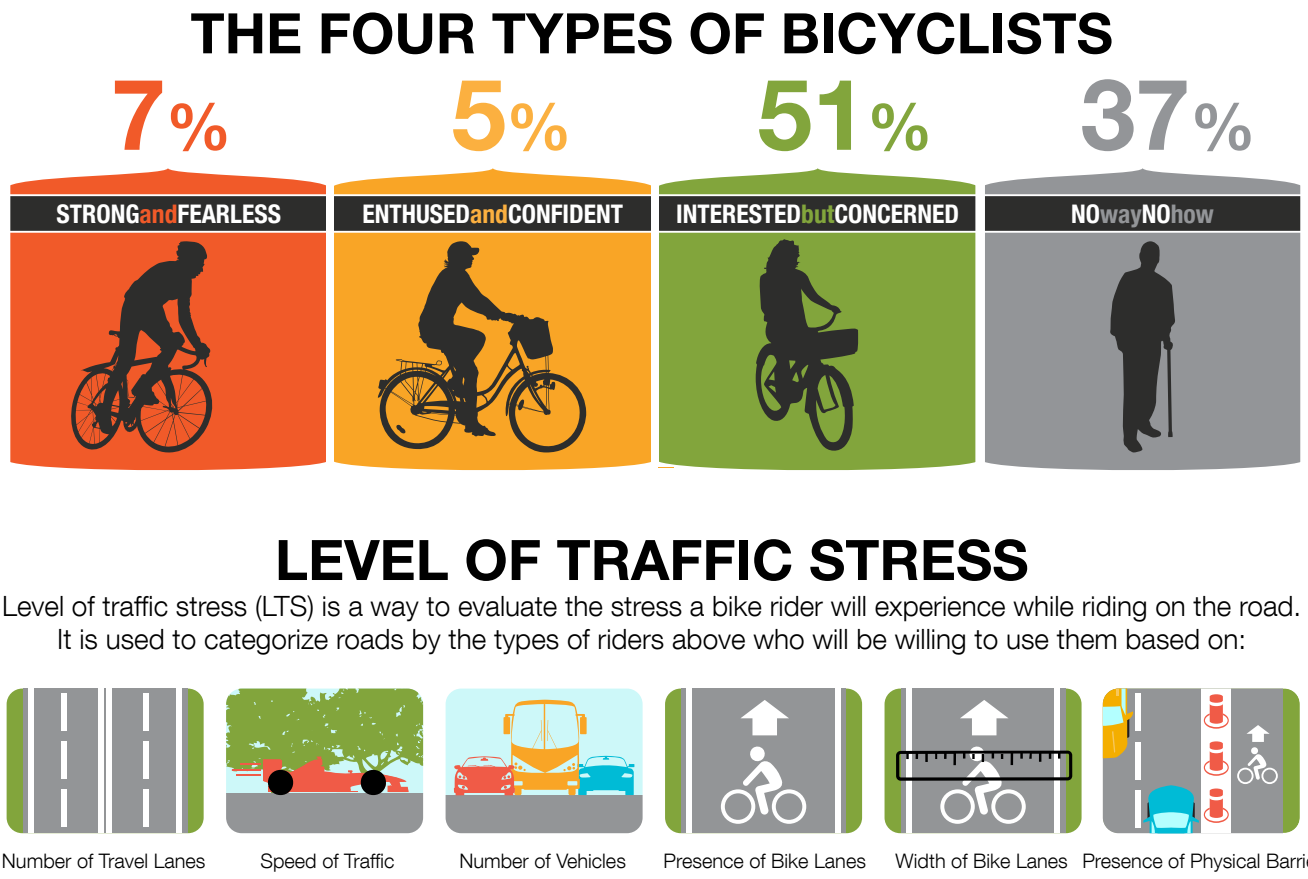
Addressing comfort is one of the most important actions any community can take to create a more bicycle-friendly transportation system. Studies have shown that a community's interest in biking can be increased by providing comfortable streets with lower-stress environments, such as providing protected and off-road bike facilities, and slowing traffic on corridors without such facilities.

Attitudes Towards Bicycling

People typically fall into one of four categories as bicyclists, as shown in **Figure 11**. When planning a bicycle network, these categories can help determine which type of facilities will provide the most comfortable experience for riders, thereby encouraging use and mode shift:

- *Strong and Fearless* People in this group are highly skilled and have the most riding experience. They will use their bicycles on arterials even when there are no bikeways present. Studies suggest that "strong and fearless" riders represent less than 1% of people in a community. This group of riders will feel comfortable using facilities with any LTS rating.
- *Enthused and Confident* This group consists of skilled riders who are also comfortable sharing the road but prefer using bikeways when they are available. "Enthused and confident" riders make up about 7% of people in a community. They typically feel comfortable using facilities with an LTS rating of 1, 2, or 3.
- *Interested but Concerned* This group of people is curious about bicycling and enjoys riding but are concerned about safety and therefore do not ride regularly. They typically avoid riding their bicycles on major arterials unless there are facilities that provide a high degree of protection. "Interested but concerned" riders represent the majority in a community (around 60%). Riders in this group may only feel comfortable using facilities with an LTS rating of 1 or 2.
- *No Way No How* People in this group are simply not interested in riding a bicycle. Riding a bicycle may not appeal to them for several reasons. It may be inconvenient, or they may not be physically able to ride. This group represents approximately 33% of people in a community.

Figure 11 Cycling Comfort and Level of Traffic Stress (LTS)




SIXTH
NO PARKING
BIKE
LANE

Collision Analysis

Making streets safer for people walking and bicycling is a key goal of this Plan. Analysis of collision records is one way to assess traffic safety in a community and can help identify key areas for infrastructure or programmatic changes that improve safety and comfort for people walking and bicycling. This section summarizes the pedestrian- and bicycle-involved collision trends and high-risk locations in Merced County. This analysis utilizes data on injury collisions from 2012 through 2021 available through the Transportation Injury Mapping System (TIMS); this represents the most recent ten years of data available on TIMS at the time of the analysis. TIMS reports injury collisions from the Statewide Integrated Traffic Records System (SWITRS), but excludes collisions that cause property damage only (PDO) and no injuries. Geographically, the data includes all collisions that occur within both incorporated and unincorporated areas of Merced County. The data excludes collisions that occur on limited-access roadways (such as freeways) but include collisions on all other roadways, including State highways and other Caltrans-maintained roadways, as well as privately-maintained roadways.

A Note on the Data Source

While collision databases like TIMS remain the best source of collision data, they have been found to have certain reporting biases, including:

- Collisions involving people walking, on bicycles, or on motorcycles are less likely to be reported than collisions with people driving
- Younger victims are less likely to report collisions
- Alcohol-involved collisions may be underreported

Race, income, immigration status, and English proficiency may also impact reporting, but there is limited research on these factors.

Overall Trends

Collisions involving active modes are more likely to result in severe injury and fatality.

During the ten-year analysis period there were 13,539 collisions resulting in injuries in the study area. Of these collisions, 794 (6%) were pedestrian collisions and 688 (5%) were bicycle collisions. These 1,482 collisions involving active modes are the subject of analysis for this Active Transportation Plan.

As shown in **Table 4**, of these 1,482 collisions involving active modes, 330, or 22%, are KSI collisions, collisions that result in someone being killed or severely injured. However, as shown in **Figure 12**, the proportion is significantly lower at 13% for all injury collisions across all modes (that is, including injury collisions involving vehicles only). This speaks to the fact that people walking or biking are particularly vulnerable in the event of a collision, as they lack the protection afforded to them by being inside a motor vehicle. As a result, collisions involving active modes are more likely to result in injury and fatality.

Table 4 Collision Summary by Year and Mode

	Bicycle	Pedestrian	Total
2012	80	71	151
2013	64	66	130
2014	86	61	147
2015	56	87	143
2016	78	100	178
2017	68	81	149
2018	82	97	179
2019	63	89	152
2020	55	54	108
2021	56	88	143
Total	688	794	1,482

Figure 12
Percent of KSI Collisions Among Bicycle and Pedestrian Injury Collisions, 2012-2021

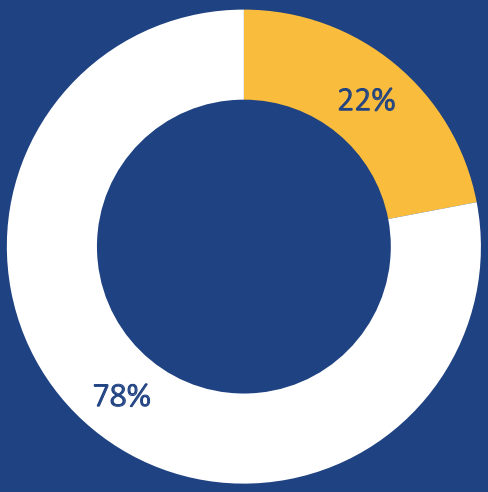


Figure 13
Percent of KSI Collisions Among All Injury Collisions, 2012-2021

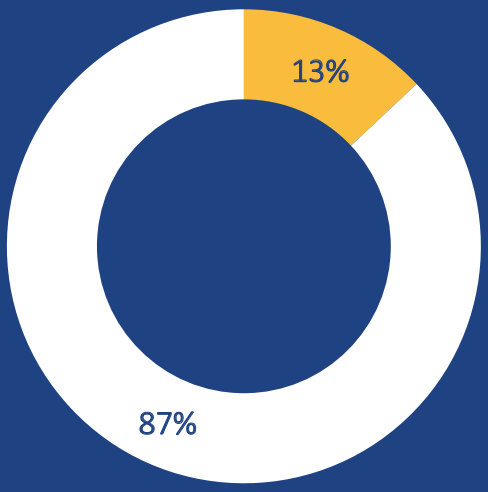


Figure 14
Bicycle and Pedestrian Injury Collisions by Year, 2012-2021

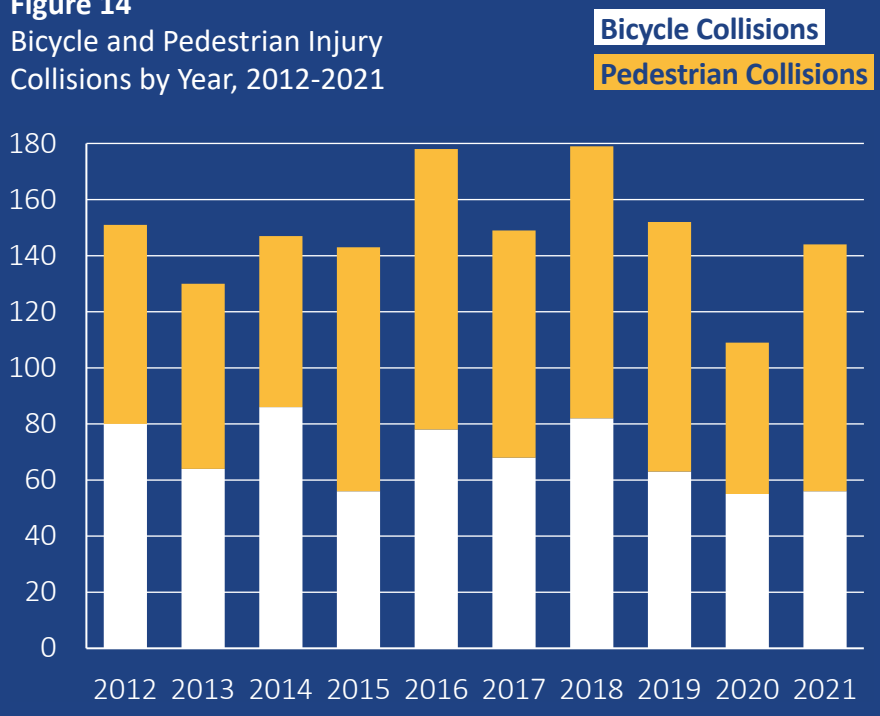
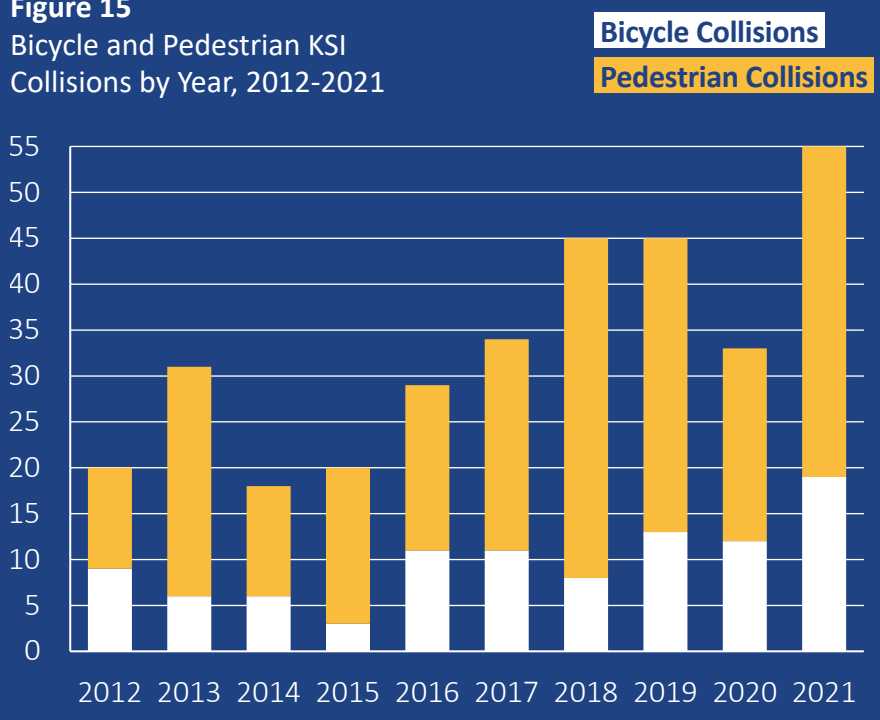


Figure 15
Bicycle and Pedestrian KSI Collisions by Year, 2012-2021



Figures 14 and **15** show the temporal trends of collisions involving active modes in Merced County. As shown, both the total number of injury collisions and the number of KSI collisions have both trended upwards between 2012 and 2019. While both the number of all injury collisions and the number of KSI collisions dropped between 2019 and 2020, this may reflect traffic trends during the peak of the COVID-19 pandemic. The number of all injury collisions rebounded upwards in 2021, and the number of KSI collisions hit a new high in 2021.

Geographic Distribution

The geographic distribution of bicycle and pedestrian collisions resulting in injury is uneven, with some communities around Merced County having higher rates of collisions than others. **Table 5** tabulates these comparisons for each of the six incorporated cities within Merced County, the unincorporated County as a whole, and major unincorporated communities.

The following sections explore particular areas and contexts of concern for these collisions.

Areas Near Schools

> *Areas adjacent to schools account for the vast majority of collisions involving active modes.*

Countywide, 52% of collisions involving active modes occur within a quarter mile of K-12 schools, and 82% occur within a half mile. Comparatively, the percentages of roadway network within a quarter and half mile of K-12 schools are only 14% and 26%, respectively.

Despite having a small geographic footprint, areas adjacent to schools are typically focal points of communities with high levels of bicycle and pedestrian activity and account for the vast majority of collisions involving active modes.

Table 5 Collision Summary by Mode, Severity, and Location

Community	Population	Bicycle Collisions		Pedestrian Collisions		Total Collisions		Collisions Per 10,000 Residents	
		Injury	KSI	Injury	KSI	Injury	KSI	Injury	KSI
Atwater	31,970	61	6	82	11	143	17	44.7	5.3
Dos Palos	5,798	0	0	1	1	1	1	1.7	1.7
Gustine	6,110	0	0	1	1	1	1	1.6	1.6
Livingston	14,172	7	1	25	8	32	9	22.6	6.4
Los Banos	45,532	81	9	114	36	195	45	42.8	9.9
City of Merced	86,333	438	59	403	104	841	163	97.4	18.9
Delhi	10,656	6	0	20	6	26	6	24.4	5.6
Hilmar	5,164	3	0	9	0	12	0	23.2	N/A
Le Grand	1,592	0	0	1	0	1	0	6.3	N/A
Planada	4,164	5	1	4	1	9	2	21.6	4.8
South Dos Palos	1,747	3	2	4	2	7	4	40.1	22.9
Santa Nella	2,211	1	0	5	2	6	2	27.1	9.0
Winton	11,709	9	2	23	9	32	11	27.3	9.4
Unincorporated County Total	91,287	101	23	168	71	269	94	29.5	10.3
Countywide	281,202	688	98	794	232	1,482	330	52.7	11.7

Source: Transportation Injury Mapping System (TIMS), 2012-2021

Driving Under the Influence (DUI)

As shown in **Figure 16**, drug or alcohol impairment was involved in 3% of bicycle-involved collisions and 10% of bicycle KSIs. Drug or alcohol impairment was also involved in 5% of bicycle-involved collisions and 14% of bicycle KSIs in Merced County outside Merced and Los Banos.

As shown in **Figure 17**, there was drug or alcohol impairment involved in 11% of pedestrian-involved collisions and 22% of pedestrian KSIs.

Drug or alcohol impairment was also involved in 14% of pedestrian-involved collisions and 32% of pedestrian KSIs in Merced County outside Merced and Los Banos.

Data suggests that KSI collisions are over-represented among collisions involving drug or alcohol impairment. This suggests that reducing driving under the influence may reduce the severity of collisions for bicyclists and pedestrians, especially in rural areas.

Figure 16 Bicycle-Involved Collisions by Intoxication Involvement

DUI Collisions

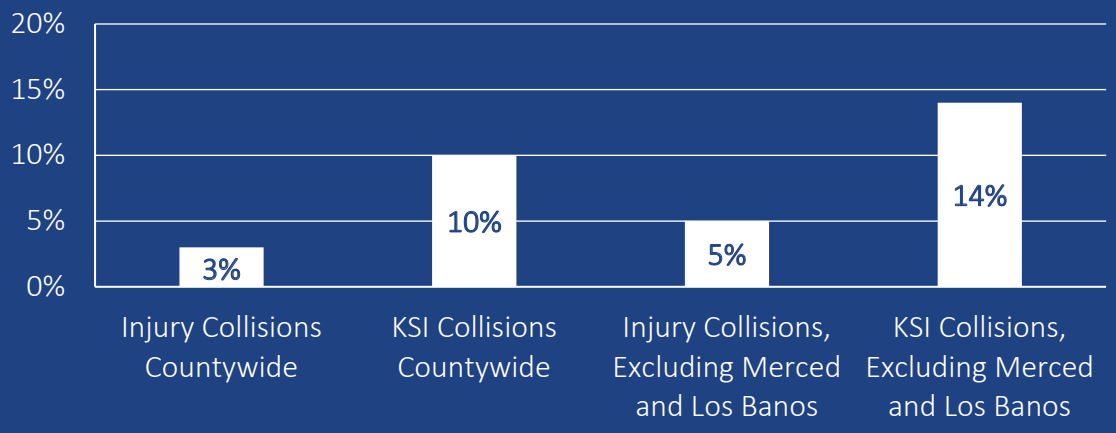
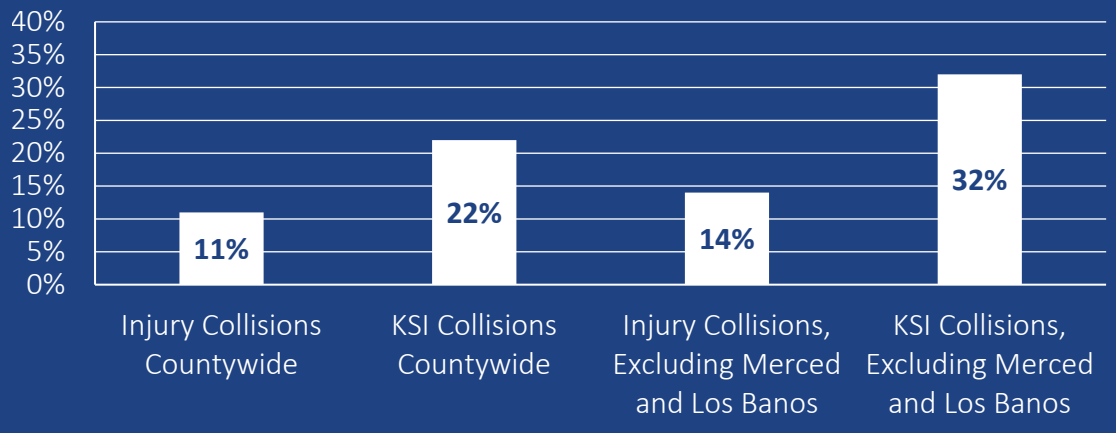


Figure 17 Pedestrian-Involved Collisions by Intoxication Involvement

DUI Collisions

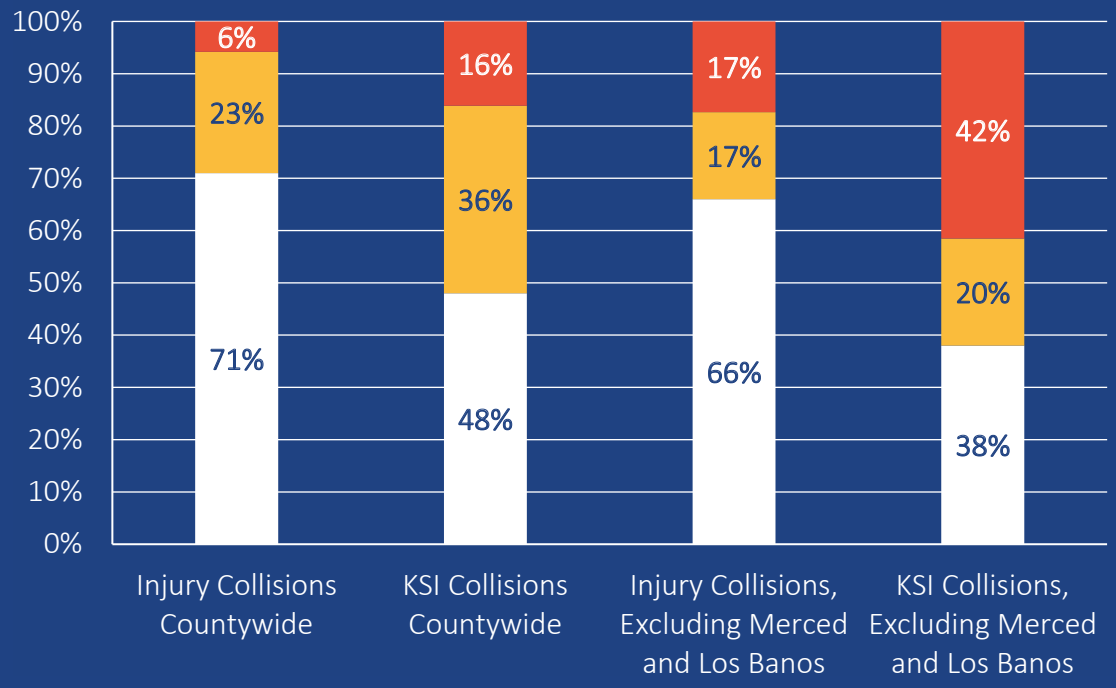


Lighting Conditions

Data shows that large shares of collisions involving active modes, and especially pedestrian and KSI collisions, are occuring in the dark. The lack of lighting is an especially pressing concern for these KSI collisions.

As shown in **Figure 18**, 71% of bicycle-involved injury collisions occurred in daylight, with the remaining 29% of collisions occurring in the nighttime – that is, in either dusk, dawn, or fully dark conditions. Of these, 20% occurred where there were no streetlights. However, among bicycle KSI collisions, the number of nighttime collisions are significantly higher, with a majority – 52% – occurring at nighttime. Of these, 31% occurred where there were no streetlights. Moreover, outside the larger population centers within the region, Merced and Los Banos, the rate of nighttime collisions are higher still, and the proportion occurring in locations without streetlights is also noticeably higher. Among bicycle-involved collisions outside Merced and Los Banos, 66% occurred in daylight, and 34% occurred in the nighttime. Of these, 51% occurred where there were no streetlights.

Figure 18 Bicycle-Involved Collisions by Lighting



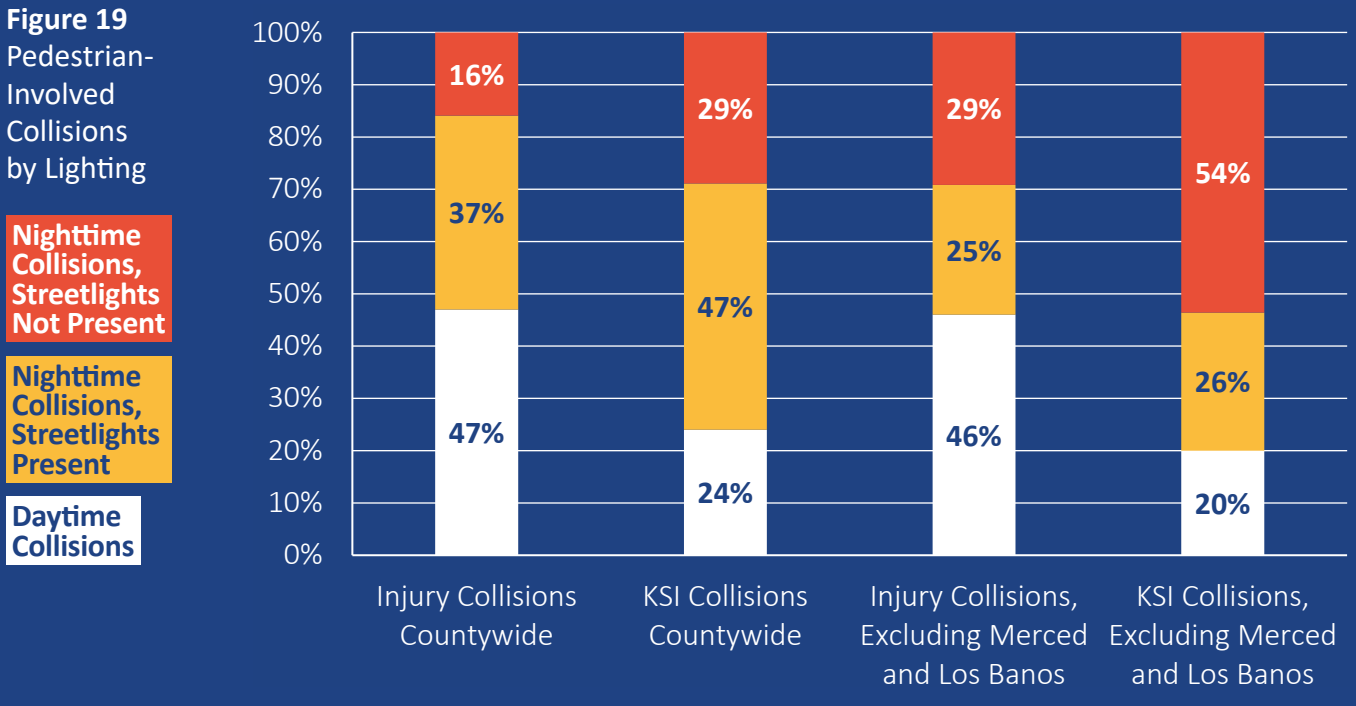
Among bicycle KSI collisions outside Merced and Los Banos, just 38% occurred in daylight, and a full 62% occurred at nighttime. Of these, 67% occurred where there were no streetlights.

As shown in **Figure 19**, among pedestrian-involved collisions, a majority overall – 53% – occurred during the nighttime. Of these, 30% occurred where there were no streetlights. Among pedestrian-involved KSIs, more than three-quarters – 76% – occurred in the nighttime. Of these, 38% occurred where there were no streetlights. Outside of Merced and Los Banos, a similar majority of 54% of pedestrian collisions occurred during the nighttime. Of these, however, 54% occurred where there were no streetlights. Among pedestrian KSI collisions outside Merced and Los Banos, four in five occurred in the nighttime, with just 20% occurring in daylight.

Of the nighttime collisions, 67% occurred where there were no streetlights.

Data suggests that a large share of bicycle- and especially pedestrian-involved collisions are occurring during the nighttime, and KSI collisions are especially overrepresented among these. Furthermore, it suggests a major issue with the availability of street lighting in Merced County, especially in areas outside major population centers. Moreover, even when collisions are reported as occuring where streetlights are present and functional, lack of adequate lighting may still be a major contributing factor. The quality of lighting can vary widely: streetlights can be insufficiently bright, placed too widely apart, or have poor coverage of people walking and bicycling outside the main travel lanes.

Figure 19
Pedestrian-Involved Collisions by Lighting



Demographic Metrics

> *Disadvantaged communities see disproportionate numbers of bicycle- and pedestrian-involved collisions.*

Population analysis identifies the size, structure, and distribution of people in a study area and helps understand trends to estimate future needs. This is particularly important in a diverse and growing region like Merced County. **Table 6** provides a countywide and incorporated cities' breakdown of population, age, and racial identity followed by jurisdictional descriptions.

There are a number of demographic metrics considered as part of this Plan to identify disadvantaged communities, including the Healthy Places Index, CalEnviroScreen 4.0, median household income, and rate of eligibility for free or reduced priced meals in the National School Lunch Program. The California Transportation Commission (CTC) identifies these metrics as qualifiers for communities being disadvantaged in the 2025 Active Transportation Program Guidelines. This project uses the metrics for disadvantaged communities identified by the CTC to identify whether collisions are happening disproportionately in them. Cross-referencing collision data indicates that disadvantaged communities see disproportionate numbers of bicycle- and pedestrian-involved collisions.

In addition, the Federal government has introduced a number of tools that it uses to identify disadvantaged communities. Two of these, the Climate and Economic Justice Screening Tool (CEJST) and the Equitable Transportation Communities (ETC) Explorer, are explored in this section.

Free or Reduced Price Meals

Eligibility to receive free or reduced-price meals under the National School Lunch Program is an indicator of child poverty. CTC qualifies areas where at least 75% of public-school students are eligible to receive free or reduced-price meals as disadvantaged.

Areas in Merced within a quarter mile of a school with 75% or more of students eligible for free or reduced-price meals are home to 46% of pedestrian- and bicycle-involved collisions, but only 10% of the roadway network. Areas in Merced within a half mile of a school with 75% or more of students eligible for free or reduced-price meals are home to 75% of pedestrian- and bicycle-involved collisions, but only 22% of the roadway network.

A Note on Funding

SB99 specifies that 25% of funds for active transportation plans must directly benefit disadvantaged communities. To fulfil this requirement, a proposed project must be located within or be within reasonable proximity to a disadvantaged community.

Table 6 Merced County Population Statistics, 2021

Characteristic		Merced County	Merced County (Incorporated Areas Only)
Age Group	0-14	24%	25%
	15-24	16%	16%
	25-34	15%	15%
	35-54	24%	24%
	55+	21%	20%
Racial Identity	Hispanic/Latinx	61%	63%
	White	26%	23%
	Black	3%	3%
	Native American	0.30%	0%
	Asian American or Pacific Islander	8%	8%
	Other	2%	0%
Speaks English Less Than Very Well		22%	22%

Source: US Census Bureau American Community Survey (ACS) 2018-2022 5-Year data

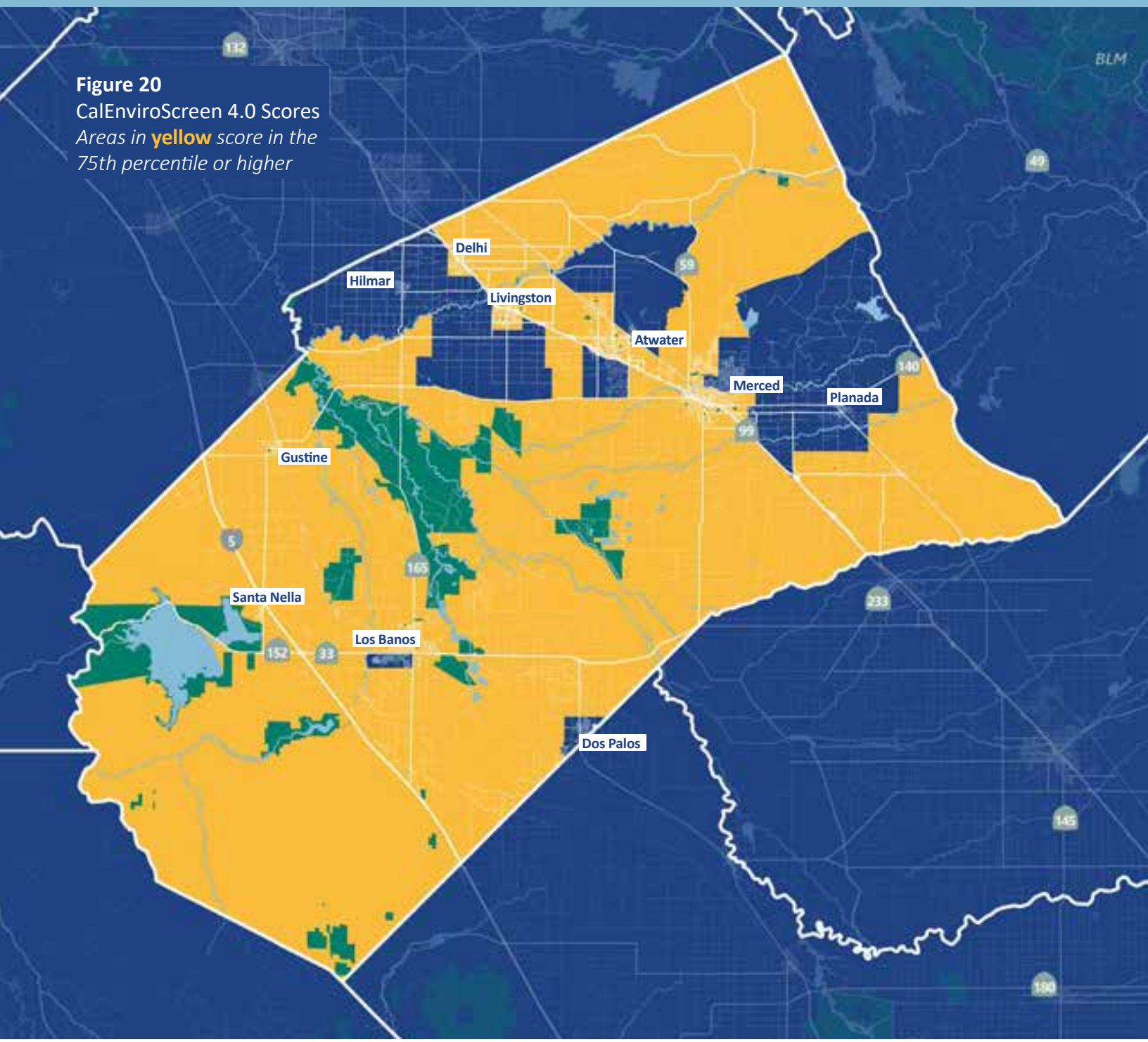


Figure 20
CalEnviroScreen 4.0 Scores
*Areas in **yellow** score in the 75th percentile or higher*

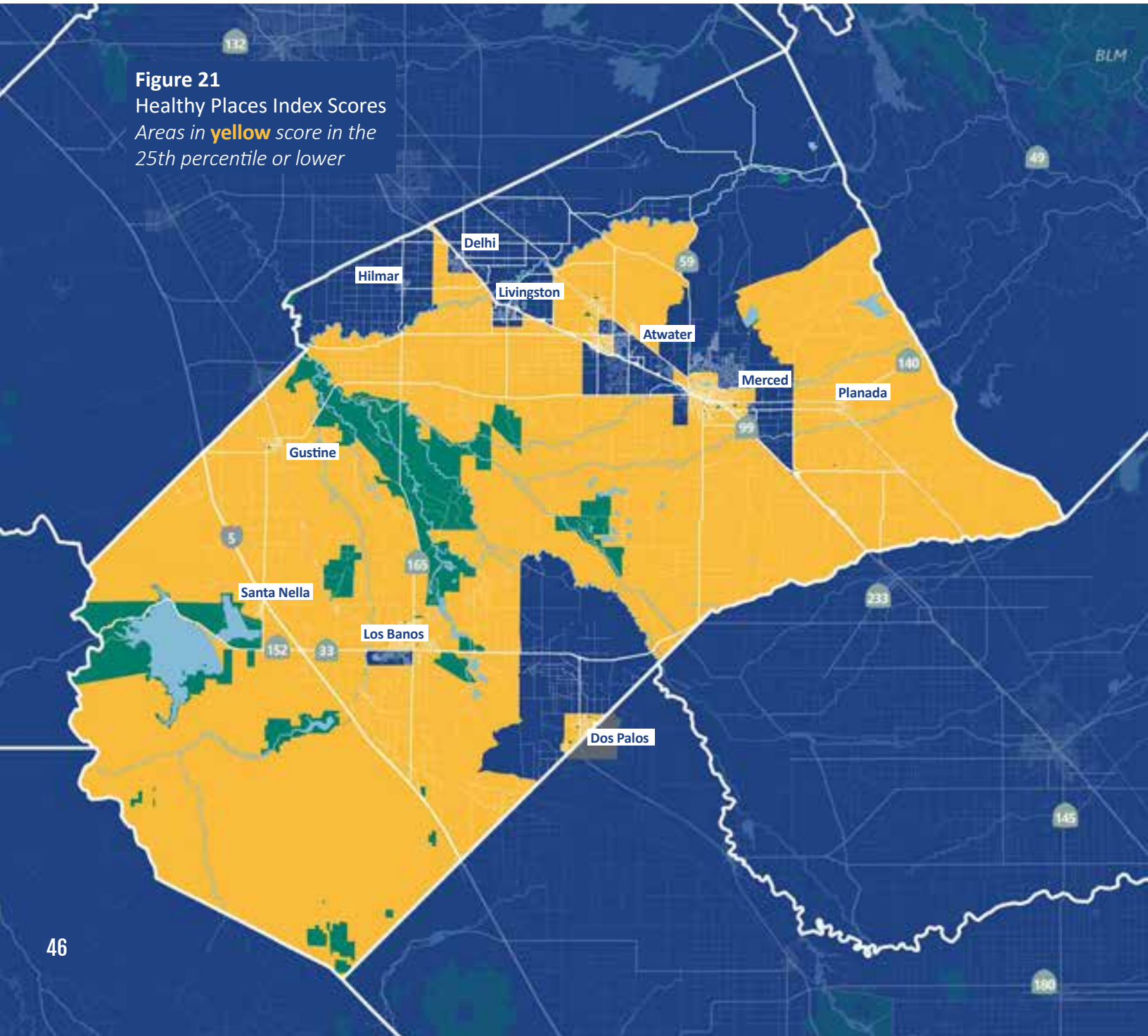
CalEnviroScreen

CalEnviroScreen 4.0 aggregates a variety of metrics to identify communities that are disproportionately vulnerable to pollution and environmental burdens. The CTC qualifies areas that scores in CalEnviroScreen's top quartile as disadvantaged communities. Areas with a CalEnviroScreen score above than the 75th percentile are home to 79% of pedestrian- and bicycle-involved collisions, but only 65% of the roadway network.

Healthy Places Index (HPI)

The Healthy Places Index uses 25 community characteristics to define a composite score of an area's health. The CTC qualifies areas that scores in the Healthy Places Index's bottom quartile as disadvantaged communities. Areas with a Healthy Places Index score below the 25th percentile are home to 70% of pedestrian- and bicycle-involved collisions, but only 56% of the roadway network.

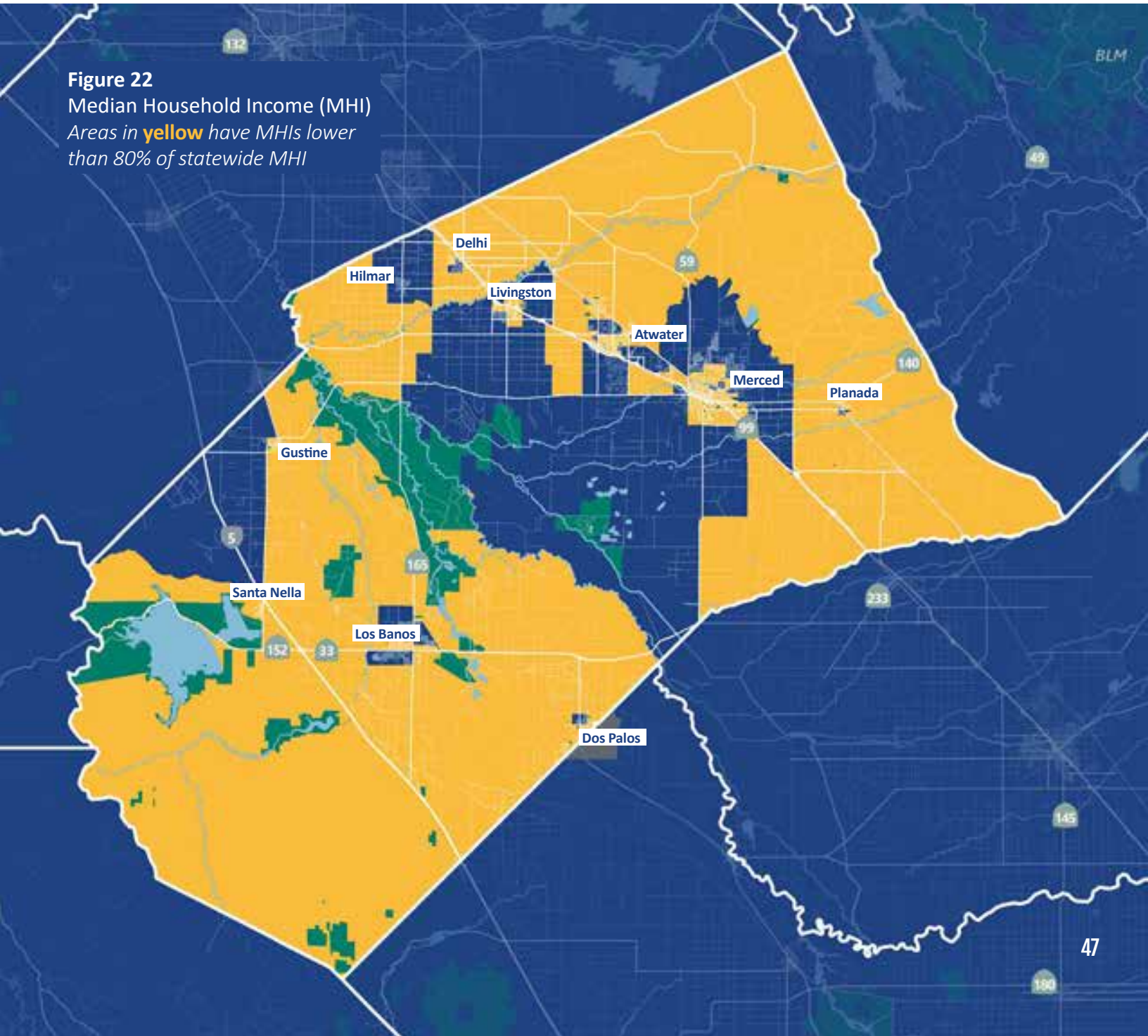
Figure 21
Healthy Places Index Scores
*Areas in **yellow** score in the 25th percentile or lower*



Median Household Income

CTC qualifies areas where the median household income is less than 80% of the statewide median income as disadvantaged communities. California's median household income in 2018 was $71,228, and 80% of this is $56,982. Areas where the 2018 median household income was below $56,982 are home to 75% of pedestrian- and bicycle-involved collisions, but only 55% of the roadway network.

Figure 22
Median Household Income (MHI)
*Areas in **yellow** have MHIs lower than 80% of statewide MHI*



CEJST Results

The Climate and Economic Justice Screening Tool (CEJST) is maintained by the Federal Council on Environmental Quality and used by many Federal programs as a means of identifying disadvantaged communities. Census tracts are screened based on a variety of factors, including climate, energy, health, housing, transportation, legacy pollution, waste, and workforce development. **Figure 23** shows areas in the region considered disadvantaged by the CEJST.

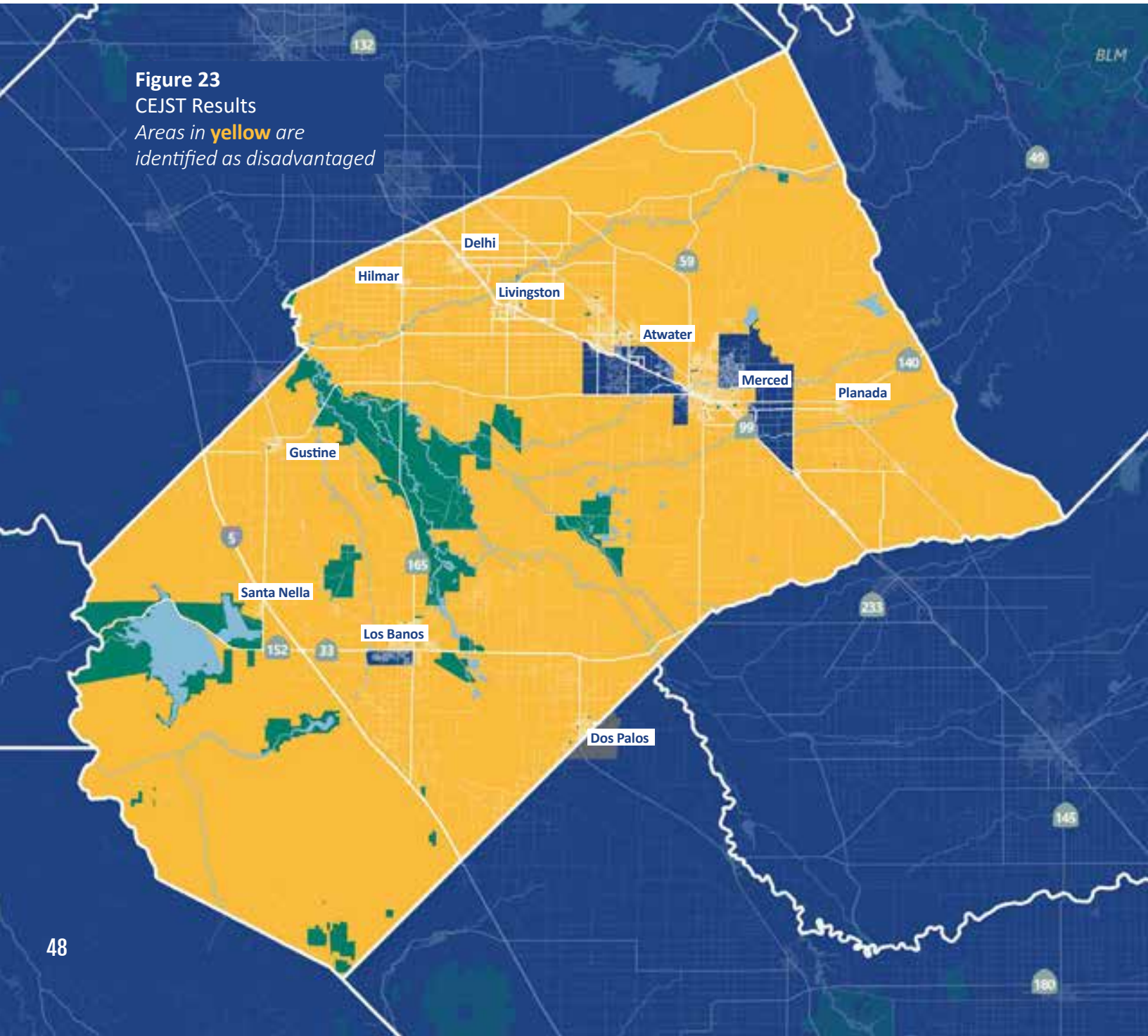
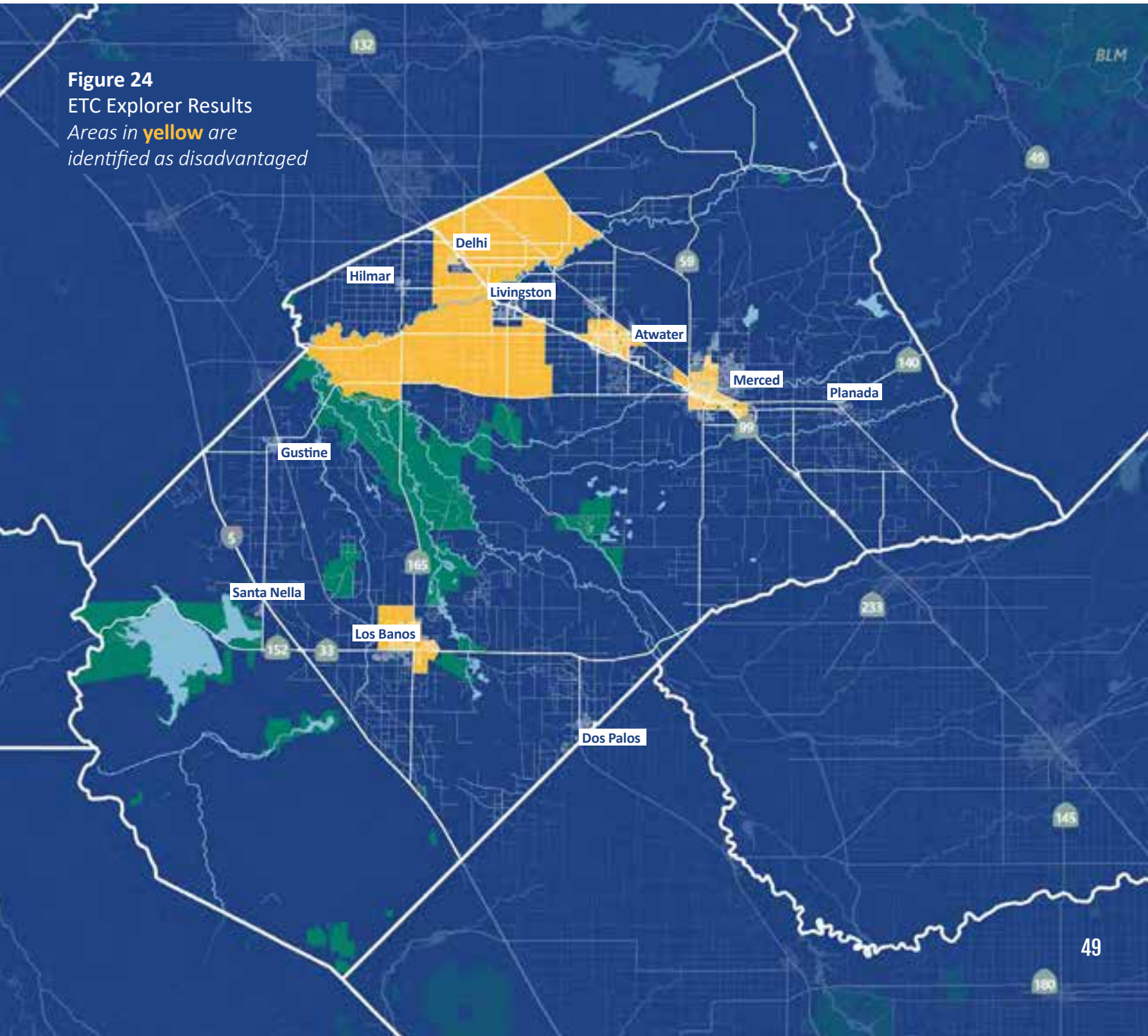


Figure 23
CEJST Results
*Areas in **yellow** are identified as disadvantaged*

Equitable Transportation Communities

The US Department of Transportation (DOT) created Equitable Transportation Communities (ETC) Explorer as part of its Justice40 initiative to complement the CEJST by providing additional insight into transportation factors specifically. The ETC Explorer is meant to capture the cumulative burden of underinvestment in transportation in a community. **Figure 24** shows areas in the region considered to be disadvantaged.

Figure 24
ETC Explorer Results
*Areas in **yellow** are identified as disadvantaged*




RAD
3

Engaging The Community

Input from residents and stakeholders of the diverse communities across the region was a fundamental part of the ATP development process. Comprehensive engagement is critical to ensure that recommended projects serve the walking and biking needs of the community. Outreach to the public helped to identify locations for needed improvements, important destinations for access, and refine preferences for types of treatments. Participation was solicited through in-person and virtual workshops and focus groups with community members, a landing page on the MCAG website that links to the project website, which was produced in English and Spanish and includes a link to a survey and interactive webmap, as well as various in-person events throughout the region.

Mayor's Bike Ride
Merced, 5/20/2023

Project Website

A website for the project, accessible from phones, tablets, and computers, was created in English and Spanish. The project website included an overview of the project, dates and times for outreach events, and an interactive map and survey that allowed the public to identify where there are existing challenges to safety walk or bike and help prioritize the recommendations included in this plan.

Overall, 195 responses were received on the survey and 84 comments were received on the project website.

Feedback provided on the website illustrated the following themes:

- *Safe Routes to School* There is broad support for creating better routes for children to access schools.
- *Speeding* Insufficient measures in place to prevent cars from speeding.
- *Need for Sidewalks* Need for more sidewalks throughout the region to complete the pedestrian network and decrease barriers for walking.
- *Insufficient Lighting* Insufficient streetlights throughout the region, with a particular emphasis on rural rounds surrounding the City of Merced.
- *Poor Road Infrastructure* The conditions of some roads makes travel feel dangerous due to potholes, steep slope changes, and a lack of pavement.
- *Difficult Crossings and Intersections* A handful of locations throughout the region lack safe crossings and proper signage or control devices.
- *Bike Lane Quality* Existing bike lanes are too narrow and often times are on roads with potholes and uneven surfaces.
- *Bike Parking* Bicycle parking is insufficient or in some instances has been removed without replacement. Respondents have called for the need of also increasing safety measures to prevent bicycle theft.
- *Bike/Ped Connectivity* Numerous segments throughout the region that have gaps in the network or end abruptly, impairing the comfort for bicyclists and pedestrians.
- *ADA Accessibility* Insufficient opportunities to cross for users with disabilities.
- *Sight Difficulties* The topography of the street such as dips or curves increases the discomfort for driving and difficulty of identifying pedestrians and bicyclists.
- *Separation of Traffic* It is difficult for bicyclists and vehicles to share the roads due to road width and lack of protection.
- *Traffic Flow* Some of the control devices throughout the region are not optimized for efficiency, leading to longer queues.

Stakeholder Focus Groups

A series of Stakeholder Focus Groups were conducted in February 2023 as part of the existing conditions analysis. The goal of these meetings was to obtain feedback on existing challenges for biking and walking for various interest groups, to build community relationships and inform future engagement efforts, and to discuss goals and measures of success for the project overall. Invitations were sent to representatives from approximately 45 stakeholder organizations and 119 school sites. Participants in the focus group meetings included representatives from schools, social service organizations, transit providers, non-profits, and agency staff including local jurisdictions and Caltrans.

Key themes that emerged from these meetings included:

- Staff resources are limited at local agencies which makes it challenging to advance projects
- Lack of knowledge about available funding and how to pursue competitive grants
- Desire for better connectivity to transit, including stops for local services and access to upcoming rail projects
- Need for better crossings over railroad tracks, which are challenging for people in wheelchairs or using mobility devices
- Overall lack of accessible pedestrian treatments countywide, and a particular need for ramps and audible signals at busy intersections
- Concern over post-crash care in rural communities that have long response times, or don't have ambulance or emergency services readily available
- General support for more robust, lower-stress treatments that separate bicyclists and pedestrians from traffic
- Support for raised crosswalks as a way to calm traffic and increase pedestrian visibility
- Support for programs that promote bicycling skills and education at all levels of school
- Improvements to social and physical health should be a goal/outcome of this project
- Desire for safe ways to access places like the Merced River or more regional recreational facilities

Community Pop-Ups

To meet people where they are, rather than requiring them to come to a meeting specifically for the ATP, project staff hosted booths at local events whenever available. These events provided the opportunity for the engagement of a broader cross-section of the public than that which would attend a typical project-specific public meeting. Pop-ups were held at the following events.

- Merced Mercado
  November 3, 2022
- Delhi Community Meeting with Leadership Counsel for Justice and Accountability
  January 19, 2023
- Merced County Taskforce – Virtual Meeting
  January 20, 2023
- South Merced Community Meeting with Leadership Counsel for Justice and Accountability
  January 26, 2023
- Merced County Spring Fair in Los Banos
  May 3-7, 2023
- Mayor's Bike Ride in Merced
  May 20, 2023
- Atwater Bike Rodeo
  May 26, 2023
- Atwater Town Hall
  May 30, 2023
- Merced County Fair in Merced
  June 7-11, 2023
- City of Merced Bicycle and Pedestrian Advisory Commission Meeting & Workshop
  June 27, 2023

Project Development Field Review

A series of in-person field visits were conducted in each jurisdiction and unincorporated communities during the project development phase. The project team met directly with agency staff and toured focus areas for each community on foot and by car. Field observations and feedback from staff directly informed project development, as discussed in Chapter 5.

Draft Plan Virtual Workshops

To solicit feedback on the draft plan, virtual workshops were held on March 27 and 28 to present the proposed improvements and gather feedback from the public. The virtual workshops were publicized on the project website and MCAG outreach channels, as well as through the standing committees of MCAG.

Public comment on the draft plan was solicited for 30 days. Changes were incorporated into the final version of this plan based on comments received, including:

- Minor editorial update---s to text
- Revisions to the City of Livingston project list and maps
- Project additions in the City of Merced
- Inclusion of projects and maps from the City of Gustine Active Transportation Plan
- Planning level costs for each proposed project

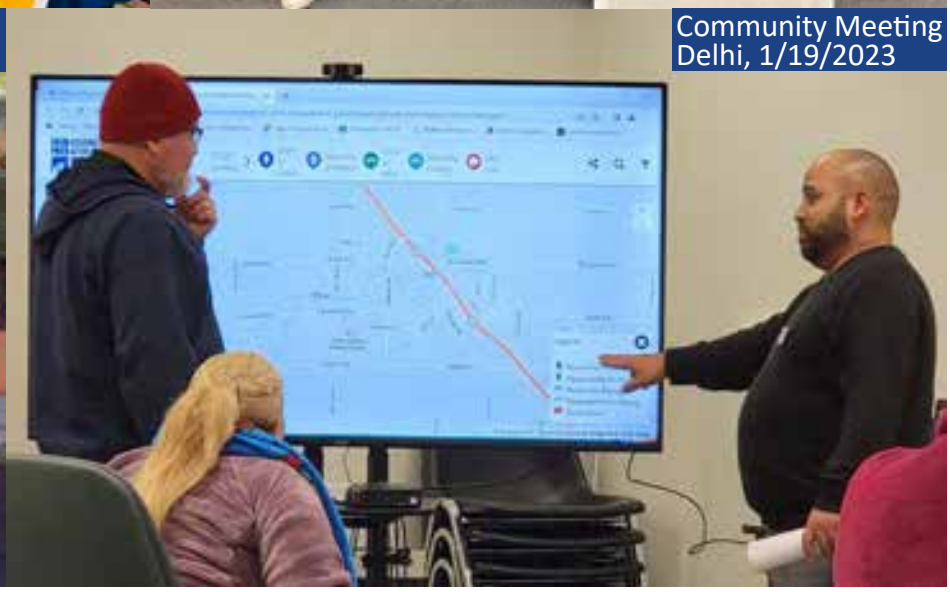
Staff Walk Audit
Livingston, 6/27/2023

Merced County Spring Fair
Los Banos, 5/4/2023

Town Hall
Atwater, 5/30/2023

BPAC Workshop
Merced, 6/27/2023

Mayor's Bike Ride
Merced, 5/20/2023



Community Meeting
Delhi, 1/19/2023

4

Active Transportation Toolbox

This chapter discusses best practices for bicycle and pedestrian infrastructure projects and non-infrastructure programs. It is focused on recommendations useful for the shared contextual characteristics of communities around the region. Because no general design guide can cover the unique characteristics of every location, this guidance should be used in conjunction with study of each individual location, engineering judgment, and other necessary considerations as appropriate for each individual application.

New projects and programs are most likely to be successful when implemented in partnership with the community. Strategies for public engagement include:

- Talking to the community to understand their desires and priorities
- Implementing new types of facilities incrementally to generate feedback and support
- Publicizing projects and educating the public on the changes to be implemented and their benefits

This toolbox draws on research and emphasizes engineering judgment, design flexibility, documentation, and experimentation.

What Are Complete Streets?

Complete Streets are designed to prioritize safety, comfort, and access to destinations for users of all ages and abilities, and for all modes of travel, including active transportation modes. Complete Streets are unique to a community's context and the needs of the surrounding area. A complete street design often balances benefits for those walking, biking, and taking transit, including improvements such as safety enhancements at crosswalks, better bus stop waiting areas, and enhanced bicycle facilities.

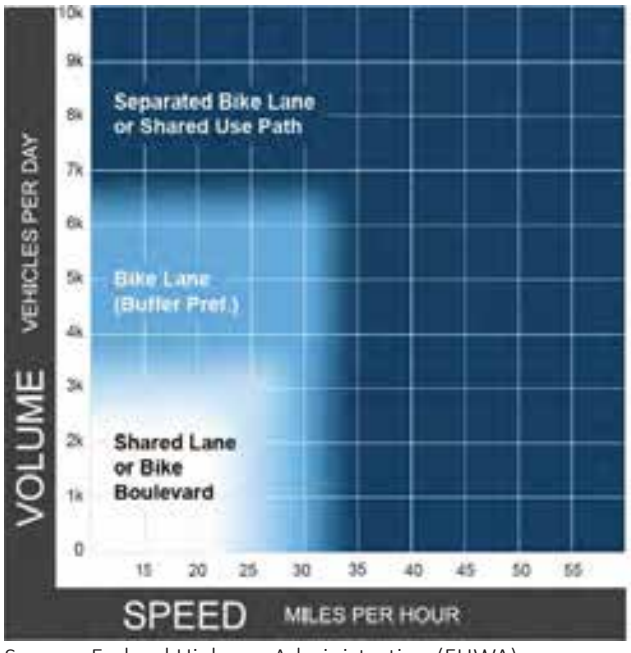
The best practices discussed in this Toolbox will contribute to the development of Complete Streets in the region.

Resources

This chapter is based on a review of existing studies, guidelines, and manuals related to pedestrian and bicycle infrastructure and strategies. The following documents are general resources for these topics:

- NACTO Urban Bikeway Guide, 2nd Edition (add years for all)
- NACTO Urban Streets Design Guide
- NACTO Transit Street Design Guide
- FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- FHWA Small and Rural Multi-Modal Networks Guide
- FHWA Separated Bicycle Lane Planning and Design Guide
- FHWA Bikeway Selection Guide (2019)
- AASHTO Guide for the Development of Bicycle Facilities, 4th Edition
- Caltrans Highway Design Manual
- Caltrans Design Information Bulletin (DIB) 94
- Caltrans Class IV Bikeway Guidance DIB 89-02
- League of American Bicyclists Benchmarking Bike Networks
- Design Manual for Bicycle Traffic (CROW Manual) (2017)
- ITE Recommended Practices on Accommodating Pedestrian and Bicyclists at Interchanges
- Association of Pedestrian and Bicycle Professionals Essentials of Bicycle Parking: Selecting and Installing Bicycle Parking That Works (2015)

Figure 25
FHWA Bikeway Selection Guidance



Source: Federal Highway Administration (FHWA)

Bikeways

Several types of bikeways and supporting facilities come together to form a complete bicycle network. Bikeways are classified in Chapter 1000 of the Highway Design Manual into four primary types, arranged in order from most separated and protected to least:

- Class I shared-use paths (bike paths)
- Class IV separated bikeways (cycle tracks)
- Class II bike lanes (includes buffered bike lanes)
- Class III bike routes (shared lanes or bike boulevards)

Bikeway Selection

The FHWA Bikeway Selection Guide and the League of American Bicyclists Benchmarking Bike Networks are good references for selecting bikeway types based on local conditions. Three primary goals are important in guiding bikeway selection:

- Safety: Reducing the frequency and severity of crashes and minimizing conflicts between users.
- Comfort: Minimizing stress, anxiety, and safety concerns for the target design user. (Comfort and safety are closely related.)
- Connectivity: Making trips direct and convenient and offering access to all destinations served by the roadway network and creating seamless and clear transitions between bikeways and general roadways.

Figure 25 is a graphic exerpted from from the guide that indicates the ideal bikeway type based on vehicle volume and speed. In this graphic and in the following section, bikeways are arranged in order from the most separation and protection from traffic to the least.

Other factors such as available right-of-way and cost may also influence bikeway selection, especially when retrofitting bikeways onto existing streets. Curb-to-curb width and parking considerations in older neighborhoods can present challenges to design. As described in the guide, other such factors include:

- Unusually high peak hour motor vehicle volumes
- High percentages of trucks and buses
- High parking turnover or curbside activity
- Frequent driveways or intersections
- High concentrations of vulnerable populations such as children and older adults

If the preferred bikeway cannot be provided, the next best bikeway should be considered, as it still may increase comfort and safety for more confident bicyclists. Alternative parallel routes may also be considered trespassing.

Class I Bikeway: Shared-Use Path

Design Principles

- Use where maximum separation from traffic is desired and right-of-way is available.
- Best in locations with little cross-flow.
- For a two-way path, provide a width of at least eight feet with a two-foot shoulder; 10 feet with a two-foot shoulder is preferred.
- For a one-way path, typically only used when transitioning to an on-street bikeway, provide a width of at least five feet and a two-foot shoulder.
- Include street crossings with measures such as bike and pedestrian activated traffic signals, median islands, and warning signs.
- At freeways, highways, and railroads, consider grade-separated crossings.
- Include curb ramps and curb cuts that are convenient and conform to the Americans with Disabilities Act (ADA).
- Ensure adequate path width, sight distance, and drainage.
- Include wayfinding signs for easier navigation.
- Provide shade to encourage use.
- Include scenic attributes such as landscaping and trail placement highlighting views.

Maintenance

- Conduct maintenance frequently to avoid hazards such as tree root cracking and debris.
- Refresh faded striping and repair or replace damaged or faded signage.
- Maintain adequate vegetation clearance.

Class II Bikeway: Shared-Use Path

Design Principles

- Provide a width of at least five feet. At least three feet should be clear of any gutter pan.
- Minimize vehicle travel and parking lane widths to reduce vehicle speeds and create safer roadway conditions for all users, and to provide maximum bike lane widths to allow bicyclists to pass other riders safely and navigate around parked cars and other road hazards.
- As available roadway width for the bike lane increases beyond five feet, consider use of painted buffers:
- Left-side painted buffers on bike lanes improve separation between bicycles and vehicles. They are especially useful in cases with vehicle speeds that are greater than 25 miles per hour.
- Right-side painted buffers can be added between parallel parked cars and the bike lane to create separation from the door zone, the space in which a driver may open their car door and hit a bicyclist.
- Lane striping (six inches wide) should be dashed through heavily trafficked merging areas, including turn lanes at intersection approaches. Refer to California MUTCD Section 9C.04 for guidance.
- May use skipped green markings in conflict zones.
- Design drainage grates to avoid catching bicycle tires.

Maintenance

- Conduct maintenance frequently to prevent and remedy roadway hazards such as potholes and debris.
- Refresh faded striping and repair or replace damaged or faded signage.

Class III Bikeway: Bike Route

Dedicated visible space for bicyclists to wait in front of vehicle traffic at a signalized intersection. Provide bicyclists priority crossing major streets. May span the entire approach, allowing bicyclists safe waiting zones for left turns, or may be placed only in front of the right-turn lane. Colored pavement, typically green, should be used to encourage compliance by motorists.

Design Principles

- Shoulders are preferable but not required.
- Sharrow markings can be used to alert drivers to presence of bikes.

Maintenance

- Conduct maintenance frequently to prevent and remedy roadway hazards such as potholes and debris
- Refresh faded striping and repair or replace damaged or faded signage.

Class IV Bikeway: Separated Bikeway

Dedicated visible space for bicyclists to wait in front of vehicle traffic at a signalized intersection. Provide bicyclists priority crossing major streets. May span the entire approach, allowing bicyclists safe waiting zones for left turns, or may be placed only in front of the right-turn lane. Colored pavement, typically green, should be used to encourage compliance by motorists.

Design Principles

- Preferred bike lane width is seven feet to allow for passing and maintenance. Also consider minimum width achievable by street sweeper.
- Minimum buffer width should be 18 inches, or three feet with parked cars.
- Best placed in areas with fewer driveways to minimize conflicts with motor vehicles.
- Require wider right-of-way than Class II bike lanes.
- Require careful design of appropriate intersection treatments.
- May use skipped green markings in conflict zones.
- Design drainage grates to avoid catching bicycle tires.

Maintenance

- Conduct maintenance frequently to avoid roadway hazards such as potholes and debris. Smaller street cleaning equipment may be required to fit between the curb and barrier.
- Maintain posts, bollards, or other physical buffer.
- Refresh faded striping and repair or replace damaged or faded signage.

Figure 26
A Bike Lane painted green through a conflict zone

Complementary Bicycle Treatments

Green-Colored Pavement

Green markings used in high volume intersections and busy driveway locations. Use skipped green in weaving areas or conflict zones. May be installed with either paint or thermoplastic. Thermoplastic is initially more expensive, but less expensive when considering maintenance life cycle costs. Although not yet incorporated into the California Manual on Uniform Traffic Control Devices (MUTCD), the FHWA MUTCD provides guidance on its use. Approach, it is important to focus on vulnerable populations such as school children and seniors.

Use
Supplemental marking in high conflict areas to improve safety.

Benefits
Calls attention to vehicle/bicycle conflict areas.

Challenges
Less effective if overused.

Through Bike Lanes

Through bike lanes reduce conflicts at intersections by allowing bicyclists to follow the preferred travel path, ideally a straight connection from the preceding bike lane. Traveling at intersections can be particularly challenging if the bike lane ends prior to the intersection forcing a merge with vehicle traffic. Continuing the bicycle lane to the intersection approach provides bicyclists the opportunity to avoid conflicts with turning vehicles. Through bike lanes should be placed to the left of the right-turn only lane. Dotted lines are used to signify the merge area that motorists traverse to get to the right-turn lane.

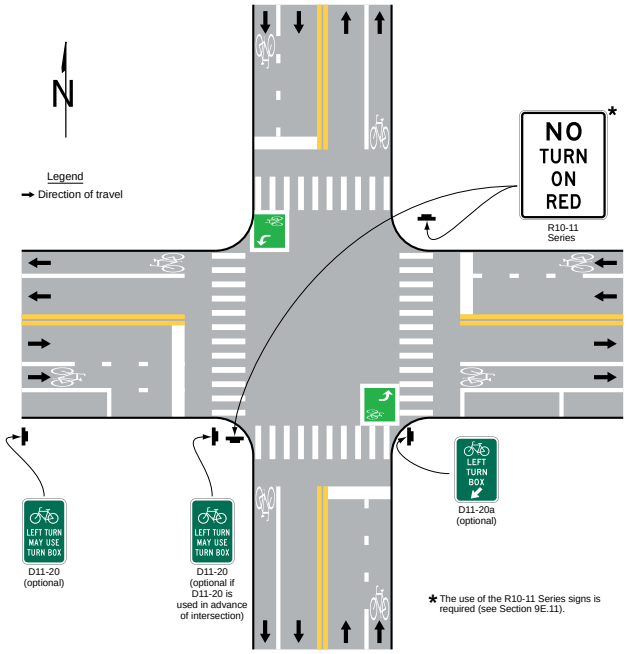
Use
Intersections where vehicle lanes conflict with bike lanes.

Benefits
Reduce conflict between through bicyclists and turning vehicles.

Challenges
Typically used with Class II bike lanes and not appropriate for use with Class IV separated bikeways.

Figure 27 Bicycle Box

Figure 28
MUTCD Guidance for Two-Stage Turn Boxes
Source: MUTCD, 11th Edition



Bicycle Boxes

Dedicated visible space for bicyclists to wait in front of vehicle traffic at a signalized intersection. Provide bicyclists priority crossing major streets. May span the entire approach, allowing bicyclists safe waiting zones for left turns, or may be placed only in front of the right-turn lane. Colored pavement, typically green, should be used to encourage compliance by motorists.

Use
At signalized intersections with a high volume of bicycles, especially those making left turns.

Benefits
Facilitate left-turn movements for bicyclists, reduce right-hook conflicts with right-turning vehicles and also reduces vehicle encroachment into crosswalks.

Challenges
Requires restriction of right turns on red and colored pavement increases maintenance costs.

Two-Stage Turn Box

Space outside of the vehicle path for bicyclists to make a left turn. During the green signal, bicyclists proceed through the intersection until reaching the box on the right-hand side. The bicyclist will be able to turn left in the bicycle box and wait for the green signal to continue through the intersection, thus making a left turn.

Use
At signalized intersections on roadways with high speeds and multiple lanes.

Benefits
Increase safety for left turning cyclists.

Challenges
Requires restriction of right turns on red and colored pavement increases maintenance costs.

Bicycle Parking

Several types of bikeways and supporting Bicycle parking encourages ridership by supporting the final stage of a bicycle trip. Locations with high ridership are excellent candidates for bicycle parking, including civic, residential, commercial, and office spaces. At these locations, both short-term and long-term parking should be accommodated.

New bicycle parking should meet the standards discussed above. Both short- and long-term bicycle parking should be supplied where appropriate, such as at schools, parks, grocery stores, and other key destinations. Business owners should be encouraged to work with the City to provide bicycle parking in visible areas in commercial districts to entice riders to stop and frequent local businesses.

Short-Term Bicycle Parking

Short-term bicycle parking is temporary bicycle parking intended for visitors. Bicycle racks are a common form of short-term parking. Bicycle racks in front of stores and other destinations allow patrons to park their bike for short periods. Bike parking should be located in well-lit areas to discourage theft. Installing permanent bicycle racks near main entrances also helps bicyclists feel welcome and encourages them to ride their bicycle again on a return trip. Bicycle racks that allow at least two points of contact, such as the wheel and frame, provide the most protection against theft and accidental damage.

Long-Term Bicycle Parking

Long-term bicycle parking is intended for employees, students, commuters, and residents to protect bicycles for extended periods. Long-term facilities are more secure than short-term bicycle parking and should fully protect bicycles from theft and weather.

Long-term bicycle parking includes bike lockers, bike cages, and bike rooms:

- *Bike lockers* are outdoor enclosures that accommodate one or two bicycles and are usually leased on a monthly basis or paid short-term use.
- *Bike cages* are fully enclosed, roofed shelters that house racks of bicycle parking, typically found at schools.
- *Bicycle rooms* are found inside office or residential buildings, and provide secure indoor parking. Bicycle rooms may feature amenities such as bike pumps and quick-fix tools for employees and residents.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Pedestrian Facilities

Pedestrian facilities include sidewalks and crosswalks, which, with some exceptions, are primarily for pedestrian use. Some types of facilities are shared by both pedestrians and bicyclists. Each of these facilities are described earlier in this toolkit:

- Class I shared-use path
- Class III bike route with multi-use shoulder

Sidewalks

Paved areas immediately adjacent to the vehicular right-of-way for the exclusive use of pedestrians. They may be used by people riding bicycles unless prohibited.

Design Principles

- Usable width should generally be five feet or more
- Crossings of driveways should be at grade
- Street trees and landscaping provide shade and comfort
- Slower vehicle speeds on the adjacent roadway increase comfort
- Pedestrian-scale lighting can increase safety and security for pedestrian walking outside of daylight hours.

Marked Crosswalks

Feature striping and other enhancements to delineate a street crossing for pedestrians. There are two types of marked crosswalks:

- Controlled: With vehicle stop signs or traffic signals.
- Uncontrolled: Without stop signs or traffic signals. Under California law, drivers are legally required to yield to pedestrians at uncontrolled crosswalks.

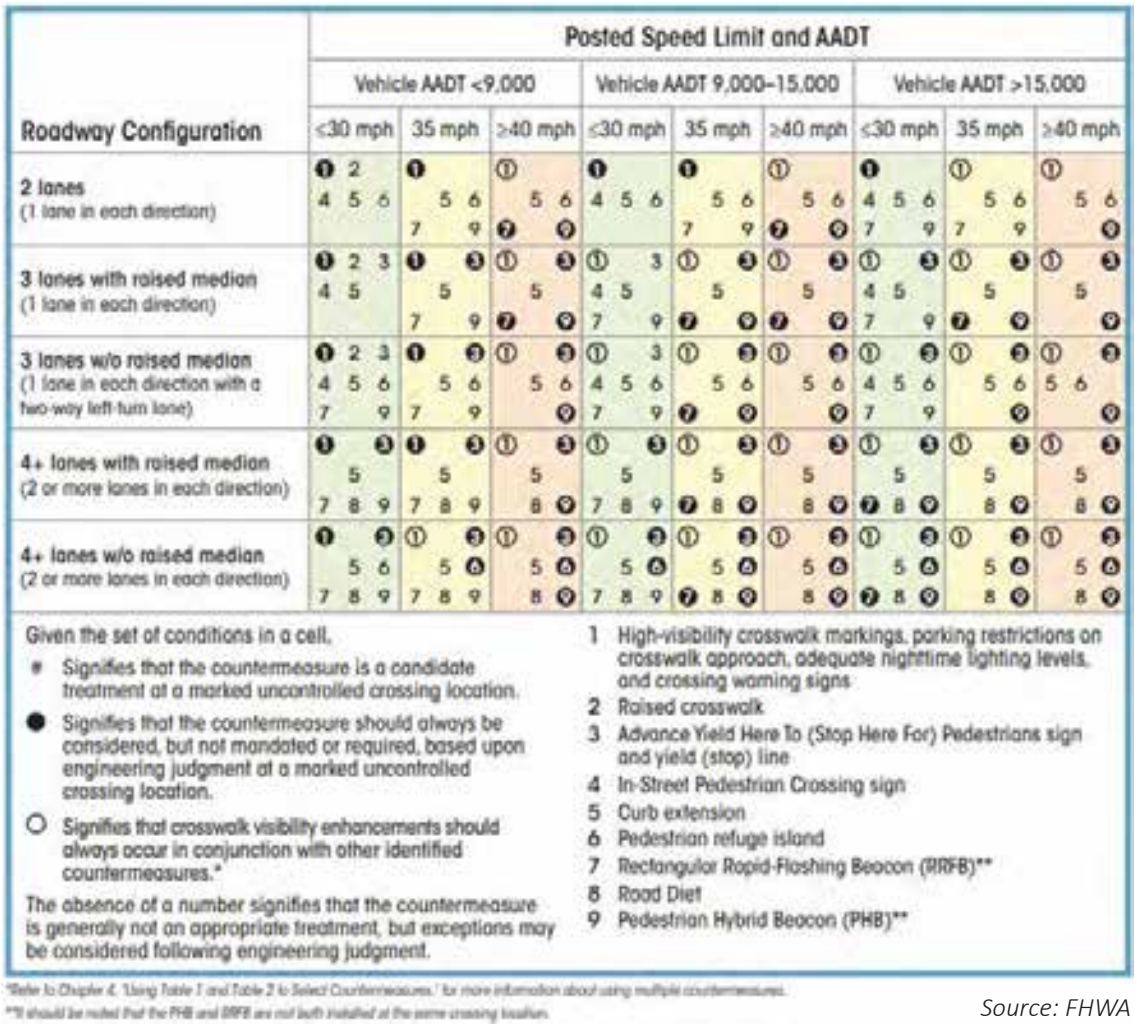
Design Principles

- Although not yet incorporated into the California MUTCD, the FHWA MUTCD provides guidance on when to mark a crosswalk.
- Of the six designs below from the California MUTCD, all except the Standard markings are considered to be high visibility, more easily discerned by drivers.
- Lines in a Continental, Double Continental, or Bar Pair marking should be spaced to avoid the wheel path of vehicles and thus reduce striping maintenance.
- Use stop lines and yield lines in conjunction with signs at crosswalks, as described in the California MUTCD, to improve driver yielding to pedestrians.

Complementary Pedestrian Treatments

The following treatments should be used with sidewalks and crosswalks as warranted. The FHWA Guide for Improving Pedestrian Safety and Uncontrolled Crossing Locations contains detailed guidance for selecting appropriate treatments, visualized as the matrix shown in **Figure 29**. Key inputs are roadway configuration (including number of lanes and presence of a median), vehicle annual average daily traffic (AADT), and posted speed limit. Refer to the Guide for additional recommendations on treatment application. The Guide also provides information on pedestrian collision analysis and selection of countermeasures base on collision analysis. Use that information when applying countermeasures in response to collision history or systemic safety analysis.

Figure 29
FHWA Matrix for Improving Pedestrian Safety and Uncontrolled Crossing Locations



Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	○ 5 6 ● ○	● 4 5 6	● 5 6 7 9	○ 5 6 ● ○	● 4 5 6 7 9	○ 5 6 7 9	○ 5 6
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5	● ● 5 7 9	○ ● 5 ● ○	○ 3 4 5 7 9	○ ● 5 ● ○	○ ● 5 ● ○	○ ● 4 5 7 9	○ ● 5 ● ○	○ ● 5
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● ● 5 6 7 9	○ ● 5 6 ○	○ 3 4 5 6 7 9	○ ● 5 6 ● ○	○ ● 5 6 ○	○ ● 4 5 6 7 9	○ ● 5 6 ○	○ ● 5 6
4+ lanes with raised median (2 or more lanes in each direction)	● ● 5 7 8 9	● ● 5 7 8 9	○ ● 5 8 ○	○ ● 5 7 8 9	○ ● 5 ● 8 ○	○ ● 5 8 ○	○ ● 5 7 8 ○	○ ● 5 8 ○	○ ● 5 8 ○
4+ lanes w/o raised median (2 or more lanes in each direction)	● ● 5 6 7 8 9	○ ● 5 ▲ 7 8 9	○ ● 5 ▲ 8 ○	○ ● 5 ▲ 7 8 9	○ ● 5 ▲ ● 8 ○	○ ● 5 ▲ 8 ○	○ ● 5 ▲ 7 8 ○	○ ● 5 ▲ 8 ○	○ ● 5 ▲ 8 ○

Given the set of conditions in a cell,

- * Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

*Refer to Chapter 4, "Using Table 1 and Table 2 to Select Countermeasures," for more information about using multiple countermeasures.
**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

Source: FHWA

Figure 30 Curb Extensions at an Intersection

Figure 31 Median Refuge Island

Curb Extensions

Curb extensions, also known as bulb-outs, decrease the pedestrian crossing distance at intersections and improve the visibility of pedestrians waiting to cross the street.

Benefits
Reduces time pedestrians are exposed to vehicles.

Challenges
Potential for higher cost due to drainage accommodations.

Median Refuge Islands

Allow pedestrians to cross one direction of traffic then wait in the center of the street to cross the other direction of traffic.

Design Principles

- Use on roadways with few gaps in traffic.
- Consider in locations with existing medians.
- If no medians are existing, consider creating space by eliminating on-street parking or narrowing vehicle travel lanes.
- Split pedestrian crossover refuge islands, generally used at uncontrolled mid-block locations, encourage pedestrians to look towards the oncoming direction of traffic before completing the crossing.

Benefits
Reduce time pedestrians are exposed to vehicles and narrows roadway, reducing speeds.

Challenges
May restrict or inhibit left turning vehicles.

Figure 32 Raised Crosswalk

Warning Signage

Improves visibility of crosswalks and increase the likelihood that a driver will yield or stop to pedestrians. Additional signage in school zones helps alert drivers that children, who are known to make unpredictable movements, may be present. An example from the MUTCD demonstrating use of both pavement markings and signs is shown below.

Design Principles

- In-street signs are ideal for streets with low vehicle speeds and two lanes. They can be permanently installed or movable for peak hours such as pick-up/drop-off times at schools.
- Overhead signs are more impactful at busier, wider streets. These are typically installed at mid-block crossings or intersections.

Raised Crosswalk

Pedestrian crossings raised to sidewalk level or just below. Act as traffic calming device.

Design principles

- Should not be constructed on streets with sharp curves or steep grades.
- Tactile treatments are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street.

Benefits

Effective in reducing vehicle speed and allows pedestrian to cross at a nearly constant grade without requiring curb ramps.

Challenges

May be have higher costs due to drainage infrastructure.

Figure 33 Rectangular Rapid Flashing Beacon

Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) are a type of pedestrian activated warning beacon that improve driver-yielding rates. They consist of rapid-flash system LED beacons that are similar in operation to emergency flashers on police vehicles.

RRFBs have generally shown the greatest effectiveness among the types of pedestrian activated warning beacons. Some jurisdictions also use signs with flashing LEDs within the border of the sign itself. However, these treatments have not been demonstrated to have efficacy comparable to RRFBs.

Benefits
Increases driver yielding and can lead to reduction in pedestrian crashes.

Challenges
Requires pedestrian activation and does not stop traffic, but require vehicles to yield.

Traffic Signal

When warranted based on the applicable signal warrants in the California MUTCD, a traffic signal to allow pedestrians to utilize a marked crosswalk safely may be appropriate. Countdown pedestrian signal heads should be used at all traffic signals, except where pedestrian crossing is prohibited.

Use
At signalized intersections on roadways with high speeds and multiple lanes.

Benefits
Reduces pedestrian-vehicle conflict points.

Challenges
May increase waiting times for pedestrians and drivers and high cost.

Figure 34 Pedestrian Hybrid Beacon

Pedestrian Hybrid Beacon

Pedestrian Hybrid Beacons (PHBs), also known as High-intensity Activated crossWalKs or HAWK signals, require vehicles to stop at a red light to allow pedestrians to cross. PHBs are ideal for roadways that are higher speeds and volumes than a rectangular rapid flashing beacon, but do not require a full pedestrian signal. They should only be installed in locations that include a marked crosswalk. The MUTCD provides details on use of PHBs.

PHBs operate with the following phases:

1. Flashing Yellow – Upon actuation, beacon flashes yellow
2. Solid Yellow – Alerts drivers pedestrians will soon cross
3. Solid Red – Drivers must stop and remain stopped
4. Flashing Red – Drivers stop and proceed when clear, as they would with a stop sign
5. No Indication – Signal is dark when not actuated

Benefits

Increases driver yielding and can lead to reduction in pedestrian crashes.

Challenges

Similar cost to a pedestrian signal

Figure 35
An intersection with Leading Pedestrian Interval implemented, showing red for vehicles but walk for pedestrians

Leading Pedestrian Interval

A leading pedestrian interval (LPI) allows pedestrians to begin crossing a signalized intersection before vehicles begin moving by providing a walk signal three to seven seconds before the corresponding vehicle signal turns green.

Benefits
Makes pedestrians more visible amd emphasizes pedestrian right-of-way.

Challenges
May increase waiting times for drivers.

Tighten Curb Radii

Tighter curb-return radii require vehicles to slow to turn more sharply at intersections. Reduced vehicle speeds increase driver awareness and thus reduce collision frequency. Slower vehicle speeds also decrease injury severity when collisions occur.

Design Principles
- Design should limit turning speeds to 15 miles per hour or less.
- Land use context and design vehicles should be considered when reducing radii; industrial areas with frequent truck traffic may require larger radii than commercial or residential areas.

Benefits
Reduce vehicle speeds and reduces pedestrian crossing distances.

Challenges
Can be costly to retrofit on existing streets and drainage and storm sewers need to be considered especially when retrofit.

Figure 36
Pedestrian Scramble at an Intersection

Pedestrian Scramble

Intersection treatments that include a pedestrian-only phase in the traffic signal cycle, when pedestrians are able to cross in all directions including to the opposite corner by traveling through the middle of the intersection. Pedestrian scrambles and diagonal crosswalks allow pedestrians to cross more efficiently, directly to their destination. Recommended for intersections with high pedestrian volumes crossing multiple crosswalks.

Benefits
Allows pedestrians to cross more directly, emphasizes pedestrian right-of-way and eliminates conflict between turning vehicles and pedestrians.

Challenges
Pedestrian-only phase may increase vehicle waiting time.

Other Treatments & Support Facilities

Some improvements can serve both bicyclists and pedestrians and can be used in combination with other treatments.

Traffic Calming

Traffic calming devices include a wide range of design treatments capable reducing vehicle speeds and thus improving the safety and comfort of the transportation network for all users. Reducing vehicle speeds makes travel safer for both bicycles and pedestrians.

Vertical deflection devices cause drivers to experience a physical response that is aggravated when traveling at high speeds. Many existing streets can be retrofitted with vertical measures.

Horizontal deflection devices are used to deflect vehicles from traveling at high speeds. Horizontal deflection measures require drivers to navigate laterally and consequentially reduce speed.

Narrowing traffic calming devices are a sub-category of horizontal deflection traffic calming devices. Wider roads are associated with greater crash rates and higher impact speeds. Narrowing roadways often leads to decreased vehicle speeds and improves safety.

Restriping narrower travel lanes for vehicle traffic via centerline and edgeline striping can reduce motor vehicle speed. Cross-hatch pavement marking applied to outer edge of a roadway to create a shoulder and reduce lane widths if the space is not used for a bike lane or parking. In many locations, interior traffic lanes can be narrowed to 10 feet or less to encourage lower speeds. Narrow lanes can make room in the roadway right of way for painted medians, center turn lanes, bicycle lanes, or parking.

Road Diets

Road diets reduce the number of travel lanes. This is typically done by converting a four lane road into a three lane road with a two-way-left-turn lane and bike lanes. The space created by removing lanes can also be used for painted medians or parking.

Design Principles
Use on roadways with current and expected future ADT approximately 20,000 or less.

Benefits
Helps to reduce speeds, reduces conflicts at crossings, can increase the separation of pedestrians from traffic.

Challenges
Can be expensive.

Wayfinding

Wayfinding refers to the network of informational signage posted to guide pedestrians or bicyclists to their destination. Good wayfinding signage presents destination, direction, and distance information in a manner that is easy to read and interpret. Bicycle specific wayfinding must be tailored so that bicyclists can see the information from a comfortable distance. Signs posted at trail junctions and intersections of trails with arterials are particularly helpful. Guidance on sign design and installation is available in Chapter 9B of the California MUTCD and the National Association of City Transportation Officials (NACTO) design guidelines. Wayfinding signage can also be enhanced with average walk times and bike times to destinations and local branding.

Lighting

Sufficient lighting on bicycle and pedestrian facilities prevents collisions that occur due to decreased visibility. Pedestrian walkways should have lighting that allows people to identify faces from a distance of about 30 feet. Lighting should be consistent to reduce deep shadows and avoid excessive glare. It is necessary to maintain conventional light fixtures regularly, keeping lamp bowls clean and promptly replacing bulbs that have burnt out. Newer light emitting diode (LED) fixtures, which have much longer bulb life, have greatly decreased maintenance requirements.

Figure 37
Street Lighting featuring dedicated illumination for both the roadway and the sidewalk

Non-Infrastructure Best Practices

In addition to physical changes to the transportation system, other programs can also benefit pedestrians and bicyclists.

Education

Bicycle and Pedestrian Education for Children

Safe Routes to School (SRTS) programs are effective ways to make walking and bicycling to school safer and more accessible for children, including those with disabilities, and to increase the number of children who choose to walk and bicycle. Creation of a SRTS Program typically includes identifying local stakeholders, identification of issues and solutions, and creation of a plan including encouragement, enforcement, education, and engineering strategies. These strategies should be accompanied by a timeline with prioritization and a funding approach[3].

Educating school-aged children on safe bicycling is important to establish active habits and travel behaviors early in life. There are a number of different programs and approaches, both formal and informal, which are effective in educating kids about safe bicycling. Kidical Mass is one event, which closes sections of roadway to vehicles, usually a route near the local elementary school, to allow families to ride their bikes without traffic. This empowers kids and families to get on their bikes and familiarizes them with the bike route to school[4].

Bicycle Education for Adults

The League of American Bicyclists has a number of resources to teach safe bicycling including informational packets, curricula, and courses with trained instructors. The Smart Cycling Quick Guide (http://bikeleague.org/quickguide) is an easy-to-read booklet that outlines the basics of a bike, rules of the road, and the knowledge everyone needs to know to ride a bike on a range of facility types safely and confidently. For a short summary, the League of American Bicyclists has a page of Smart Cycling Tips for biking safely including maintenance and trail etiquette[5].

Bicycle Ambassadors

Bicycle ambassadors are either volunteers from the community or employees of local advocacy groups that take a leading role in educating, encouraging, and activating the community to be a safer and more comfortable place for bicyclists. Ambassadors have undergone a safety education course and are also supplied with maintenance and educational resources to distribute to the community both formally and informally. This educational model empowers community members through a bottom-up approach to improving bicycle safety and mode share. Some examples of bicycle ambassador programs include Fort Collins, Missoula, and Washington, DC[6].

Encouragement

Encouragement can occur through local groups and regular events and campaigns. Local schools can encourage biking and walking through bike rodeos, fun runs, walkathons, and bike/walk/roll to school events. Programs such as "walking school buses," a program where kids and families walk to school in groups, are other good opportunities for neighborhood schools to encourage walking. Local running, walking, hiking, and biking events also encourage active engagement for adults. Bike to work events are also useful to encourage adult bicycling.

Typical campaigns are often focused on videos and downloadable materials or public advertisements on buses or public billboards. These campaign messages can be reformatted to reach wider audiences through social media communication tactics. Key messages can be finessed to reach target areas and groups.

Training

It is important for the police department to include collision reporting and bicycle and pedestrian rules of the road into their training. There are a number of resources from other communities and national sources that can be used, such as a video resource created by the National Highway Traffic Safety Administration (NHSTA).[7]

Enforcement

Proper enforcement is important to ensuring the safety of the street network for bicyclists and pedestrians. This is done through proper training of law enforcement, increasing the safety of bicyclists and pedestrians, theft prevention, and the proper pairing of education and enforcement.

Local law enforcement can partner with schools to step up enforcement of good motor vehicle behaviors around pedestrians and bicyclists at the beginning of the school year. Continuing this effort periodically throughout the school year and expanding it to other places frequented by pedestrians and bicyclists can further help active transportation.

Bicycle Patrol Units

Bicycle fleet officers improve the relationship between officers and bicyclists and improve the effectiveness of enforcement for all modes as it affects bicyclists' safety.

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3 Information on Safe Routes To School is located at http://guide.saferoutesinfo.org/steps/index.cfm

4 Information on Kidical Mass is located at http://kidicalmassdc.blogspot.com/p/abcs-of-family-biking.html

5 Information on the League of American Bicyclists is located at http://bikeleague.org/content/smart-cycling-tips-0

6 Information on Bicycle Ambassadors in Fort Collins is located at http://bicycleambassadorprogram.org/, in Missoula is located at http://www.ci.missoula.mt.us/DocumentCenter/Home/View/4604, and in Washington, DC is located at http://www.waba.org/programs/d-c-bike-ambassador/

7 http://www.nhtsa.gov/multimedia/bicycles/bicycle_safety_LE.wmv

Figure 38 Speed Feedback Sign

Speed Management

Raising awareness of speeding is important at a neighborhood level and can be achieved through local events and education. Residents are less likely to speed if they know their neighbors.

Speed monitoring programs train residents in using radar detectors which then distribute warnings to speeding vehicles. This type of program helps residents understand that this is a local and personal issue and the importance of driving the speed limit. Pairing education with enforcement by distributing warnings and educational materials before giving tickets provides drivers with a deeper understanding of the law and its value.

Speed feedback signs and radar trailers that display real-time signs and flash when drivers exceed the limit. Radar trailers are appropriate on a temporary basis only. These treatments are useful on corridors with prevalent cases of speeding that lack room for physical measures or in conjunction with recent construction of physical measures.

However, speed monitoring and feedback signs may have only temporary effectiveness as drivers grow accustomed to their presence.

Police Participation in Education

Safety, as discussed in the Education section, can also be applied as a responsibility of the police department. Officers practice this by distributing literature on safe pedestrian habits as part of enforcement efforts and meetings and events with students and the public. This can include education on proper helmet use, light giveaways, and targeting infractions.

Bicycle Diversion Programs

Bicycle diversion programs provide bicyclists who are cited for certain infractions the option to attend a bicycle safety class rather than paying a ticket. This educational component is associated with a greater degree of lasting behavior change.

Bike Theft

The fear and reality of bike theft can be a barrier to bicycling for all users. Recommendations for reducing bike theft include improving locking practices through education, providing adequate bicycle parking facilities, providing bicycle registration, providing recovery resources and programs, and offender detection such as bait bikes.

Electric Mobility Devices

Electric bicycles (e-bikes) and other electric mobility devices such as electric scooters are a rapidly growing new transportation alternative in cities and other areas in California. These devices provide a potential option to cover longer travel distances and steeper grades. Bike share companies that include electric bikes and electric scooter rentals are common in many cities. By improving personal mobility without requiring use of a car, these devices may also be an appealing option to aging but active populations.

E-Bikes

California Vehicle Code (CVC) designates three classes of e-bikes (CVC Section 312.5):

- Class 1 – low-speed pedal-assisted electric bicycle: Bicycle equipped with a motor that provides assistance only when the rider is pedaling and that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 2 – low-speed throttle-assisted electric bicycle: Bicycle equipped with a throttle-actuated motor that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 3 – speed pedal-assisted electric bicycle: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 28 mph.

Class 1 and 2 e-bikes are generally treated similarly to regular bicycles:

- There is no minimum age to ride.
- Helmets are required for ages 17 and under.
- Allowed on all classes of bikeways, unless prohibited by the local jurisdiction (CVC Section 21207.5).

Class 3 e-bikes have more limitations on their use:

- Riders must be 16 years of age or older.
- A helmet is required for all riders.
- They are allowed on Class II bike lanes or Class III bike routes, but not allowed on Class I shared-use paths or Class IV protected bikeways (CVC Section 21207.5).

Electric Scooters

The CVC defines an electric scooter as a "motorized scooter": any two-wheeled device that has handlebars, has a floorboard that is designed to be stood upon when riding, and is powered by an electric motor. This device may also have a driver seat that does not interfere with the ability of the rider to stand and ride and may also be designed to be powered by human propulsion (CVC Section 407.5). Limitations on their use include:

- Riders must use Class II bike lanes when they are present (CVC Section 21229).
- Motorized scooters are not allowed on roads with a speed limit in excess of 25 miles per hour, unless in a Class II bike lane or Class IV separated bikeway (CVC section 21235). This prohibition includes street designated as Class III bicycle routes. A local authority may, by ordinance or resolution, authorize the operation of a motorized scooter outside of a Class II or Class IV bikeway on a highway with a speed limit of up to 35 miles per hour.
- Motorized scooters are allowed on all other classes of bikeways unless prohibited by the local jurisdiction (CVC Section 21230).
- Riders are prohibited from using sidewalks, except when entering or leaving adjacent property.
- A helmet is required for all riders under 18 years of age.
- A valid driver's license or instruction permit is required.
- Speeds are limited to 15 miles per hour,
- Leaving a scooter on its side on a sidewalk, or otherwise parking one so that there was not an adequate path for pedestrians, is prohibited.

Electrically Motorized Boards

According to California Vehicle Code, the term "electrically motorized board" is any wheeled device that has a floorboard designed to be stood upon when riding with a maximum speed of 20 miles per hour. The device may be designed to also be powered by human propulsion (CVC Section 313.5).

- Use is restricted to roads with speed limits of 35 miles per hour or less, unless operated in a Class II or Class IV bikeway. On other bikeways, speed is limited to 15 miles per hour (CVC Section 21294).
- Riders must be 16 years of age or older.
- A helmet is required for all riders.

Electric Personal Assistive Mobility Devices

According to California Vehicle Code, the term "electric personal assistive mobility device" (EPAMD) means a self-balancing, non-tandem two-wheeled device that can turn in place, with a maximum speed of 12.5 miles per hour (CVC Section 313). The most common example is the Segway. "Pedestrian" includes use of EPMADs (CVC Section 467). EPAMDs can operate on bikeways and sidewalks unless prohibited by the local jurisdiction, but must yield to pedestrians (CVC Sections 21281.5 and 21282)

Table 7 State Restrictions* on Electric Mobility Devices by Facility Type

Device Type	Facility Type:	Class I shared use paths	Class II bike lanes	Class III bike routes	Class IV separated bikeways
Class 1 E-Bike		Allowed	Allowed	Allowed	Allowed
Class 2 E-Bike		Allowed	Allowed	Allowed	Allowed
Class 3 E-Bike		Prohibited	Allowed	Allowed	Prohibited
Electric Scooter**		Allowed**	Allowed**	Allowed**	Allowed**
Electrically Motorized Board		Allowed	Allowed	Allowed	Allowed

* Local jurisdictions may enact further restrictions.
** Prohibited on roadways with speed limits above 35 miles per hour

Access

Laws for each electric device are different. E-bikes generally have more options for locations to ride, as summarized in **Table 7**.

Bike and Scooter Share

In addition to private ownership, bikes, e-bikes, and scooters are available through short-term point-to-point rental or "shared" systems. Bike share systems at first were primarily based on docks, or unmanned physical locations where a bike could be rented or returned, with docks located at destinations across an area.

More recently "dockless" systems, where bikes or scooters, equipped with appropriate wireless technology, could be rented at any location or left at any location, have become more widespread. The systems can often be deployed and operated at lower cost that docked systems. However, concerns have arisen in some locations about dockless bikes or scooters being parked in inappropriate locations, in particular when they have blocked pedestrian flows. Some cities have responded to this by developing "corrals," marked pavement locations where bikes or scooters can be left standing out of the way of pedestrians and other traffic.

Considerations When Determining Access Policy

When determining access for electric bicycles and other electric devices, the following issues should be considered:

- Electric mobility devices provide increased mobility for users who are less able to use regular bicycles due to age or disability.
- Terrain with frequent elevation changes may discourage some people from walking or bicycling as transportation. Electric mobility devices may encourage more people to reduce use of motor vehicles.
- Higher-speed electric mobility devices may generally be faster than most bicycles and pedestrians.
- Some non-electric bike users and pedestrians may consider e-bikes and other powered to detract from their experience on bikeways and trails.
- Consideration should be given to regulating parking and storage of devices so that they do not impede pedestrian or other traffic, in particular through the use of corrals.
- The data that bike and scooter share companies collect can be valuable to a jurisdiction seeking to understand the movement of people and planning for them.

Policy Options

Use of these devices is expect to continue to expand, and sharing services are expected to spread.

Electric scooters have spread rapidly into different cities, but some concerns have attended their spread. A large concern with scooters has been their mixing with much slower pedestrian traffic. Some cities have responded by prohibiting sidewalk use, but on streets with fast vehicles and heavy traffic without bike lanes, they may be forced t to mix with vehicular traffic, which may be less comfortable or safe and reduce overall use. Speed limits for scooters are another option, but enforcement may be challenging.

Jurisdictions have several policy options for e-bikes and other electric mobility devices. Different policies may be enacted for each device. Access options include:

Maintain existing access as allowed by state law.

This option provides the most mobility and accessibility for those who use these transportation options.

Prohibit access to sidewalks and Class I shared-use paths, where pedestrians are also present, but continue access to other bikeways.

- This option separates the slowest and some of the fastest users of the path, but will not eliminate all fast riders, as regular bicycles may travel as fast as or faster than e-devices.
- This option would result in more e-devices mixing with motor vehicle traffic.
- In some locations, there may be no access for electric scooters, which are prohibited from roads with speed limits greater than 35 mph unless a bike lane or separated bikeway is available.

For Class 3 e-bikes, prohibit access to all bikeways except Class III bike routes.

- This option provides the greatest restriction and separation.
- This option would force e-devices to mix with vehicular traffic, which may be less comfortable or safe and reduce overall use of e-devices, and under some conditions may be prohibited by state law.

When developing these policies, consideration should also be given to other issues:

- Develop policies concerning parking and storage of these devices, especially sharing systems, to minimize impacts on flows of pedestrians and other vehicles. These policies may require use of corrals, prohibit blocking of entrances, or other aspects.
- Develop data sharing agreements in conjunction with permitting new shared services.

5

Network Recommendations

This chapter discusses the recommended networks for walking, bicycling, and supportive facilities for each city and the unincorporated county.

Project Development

The proposed projects represent a long-term vision of active transportation facilities for the region. This includes shared-use paths and trails, bike lanes and boulevards, sidewalks, and crossing enhancements. A focus is placed on safe routes to school, connections across barriers, access to destinations, closing gaps, and recreational opportunities. The recommended project type is based on the design considerations and best practices discussed in chapter 4. In general, project locations were identified based on the following considerations:

- Connectivity to destinations such as schools, parks, trails, and civic institutions
- Gaps in or upgrades to the existing network
- Collision history
- Priority projects from previously adopted plans
- Community input
- Feedback from jurisdiction staff

Prioritization and Cost

Prioritizing projects provides an understanding of how to target investments to meet community needs and strategically position projects for competitive grants. Project prioritization reflects the overall goals of the ATP by focusing on safety, access to schools and community destinations, equity, and connectivity. Each project was scored by a set of factors, then weighted by significance and normalized to provide a total score for each project by jurisdiction. These factors are aligned with the eligibility criteria for the California Active Transportation Program, which remains the primary statewide source of funding for the implementation of bicycle and pedestrian projects. Details of the prioritization process can be found in **Appendix C**. Prioritization factors include:

Safety

- History of fatal or severe injury collisions
- Presence on Bike/Ped high injury network

Access and Connectivity

- Contributes to low stress network or closes critical gap
- Proximity to schools
- Population density
- Proximity to libraries, parks, and transit stops

Equity and Disadvantaged Community Factors

- Student poverty (schools with high rates of free and reduced-price meal eligibility)
- Healthy Places Index
- CalEnviroScreen
- Median Household Income
- Climate and Environmental Justice Screening Tool (CEJST)
- Equitable Transportation Community ranking (ETC)

Projects range in cost and effort and may be years-long efforts. Feasibility is also dependent upon the availability, reallocation, and/or acquisition of funding. Additionally, although projects are prioritized based on the criteria noted above, projects may be integrated into maintenance projects and undertaken for a lower cost than if implemented separately. In these cases, some lower priority projects may be implemented before higher priority projects.

Projects requiring land acquisition, utility relocation, or substantial drainage modifications may require extra time to implement. Detailed feasibility and design studies based on local conditions will also be necessary for the implementation of many projects. To give a general idea of the anticipated costs to implement and support funding procurement, cost estimates were developed at a planning level for each project.

Prioritized project lists that correspond to the maps in this chapter are provided in **Appendix D**.

Unit cost estimates for projects are listed below in **Table 8**. The cost ranges are based on construction costs from recent bid documents throughout California, recognizing regional variations on construction costs throughout the state and fluctuations in material and labor costs over time. The cost estimates are in 2024 dollars, and also assume a 25% contingency, 60% for miscellaneous items, and 55% for soft costs. Land acquisition, road widening, and utility relocation costs that may be needed are not included in the cost estimates.

Table 8 Cost Estimates by Improvement Type

Improvement Type	Assumptions	Cost
Class I shared-use paths/trails	1 mile of asphalt path (10' path + 2' shoulder), with landscaping (trees) and pedestrian-scale lighting	$4,800,000
Class II bike lanes	1 mile with 4 unsignalized intersections: Bike lane striping, wayfinding signage, green conflict zones, two-stage turn boxes, bicycle detection-loop	$260,000
Class IIB buffered bike lanes	1 mile with 4 unsignalized intersections: Buffered bike lane striping, wayfinding signage, green conflict zones, two-stage turn boxes, bicycle detection-loop	$415,000
Class III bike lanes	1 mile with 8 unsignalized intersections: Green-backed sharrows, wayfinding signage	$120,000
Class IIIB bike boulevards	1 mile with 8 unsignalized intersections: Green-backed sharrows, bicycle boulevard wayfinding signage and striping	$200,000
Class IV separated bikeways	1 mile with 8 unsignalized intersections: In-roadway cycle track with paint and plastic improvements such as striped buffers, wayfinding signage, green conflict zones, two-stage turn boxes, bicycle detection-loop, soft hit posts Green-backed sharrows, bicycle boulevard wayfinding signage and striping	$485,000
Sidewalk	1 mile per each side of roadway	$1,100,000
Intersection Improvements (High Effort)	May include improvements including high visibility striping, raised curb extensions, ADA accessible curb ramps, new signal for a 4 leg intersection	$1,400,000
Intersection Improvements (Medium Effort)	May include improvements including high visibility striping, raised curb extensions, ADA accessible curb ramps, PHB, existing signal modifications (Signal head modifications, installing APS, yellow backplate, switching out signal heads, countdown ped heads, detection, timing upgrades (e.g. LPI) for a 4 leg intersection	$550,000
Intersection Improvements (Low Effort)	May include improvements including high visibility striping, painted curb extensions, ADA accessible curb ramps at an unsignalized intersection	$250,000
Crossing Improvements (Midblock/RRFB)	May include improvements such as high visibility striping, RRFB, raised curb extensions, additional signage, median island, and ADA accessible curb ramps for 1 crossing	$125,000
Bike/Ped Bridge	Construction of a new bicycle and pedestrian bridge	$15,000,000
Railroad Crossing Improvements	Bike/ped crossing gates, improvements to smooth cross-ing area	$550,000

All project cost estimates are high-level, and detailed study of individual projects will be required to refine them. Costs are not inclusive of engineering, draingage, contingency, and mobilization costs, as well as any land acquisition, road widening, and utility relocation costs that may be needed.

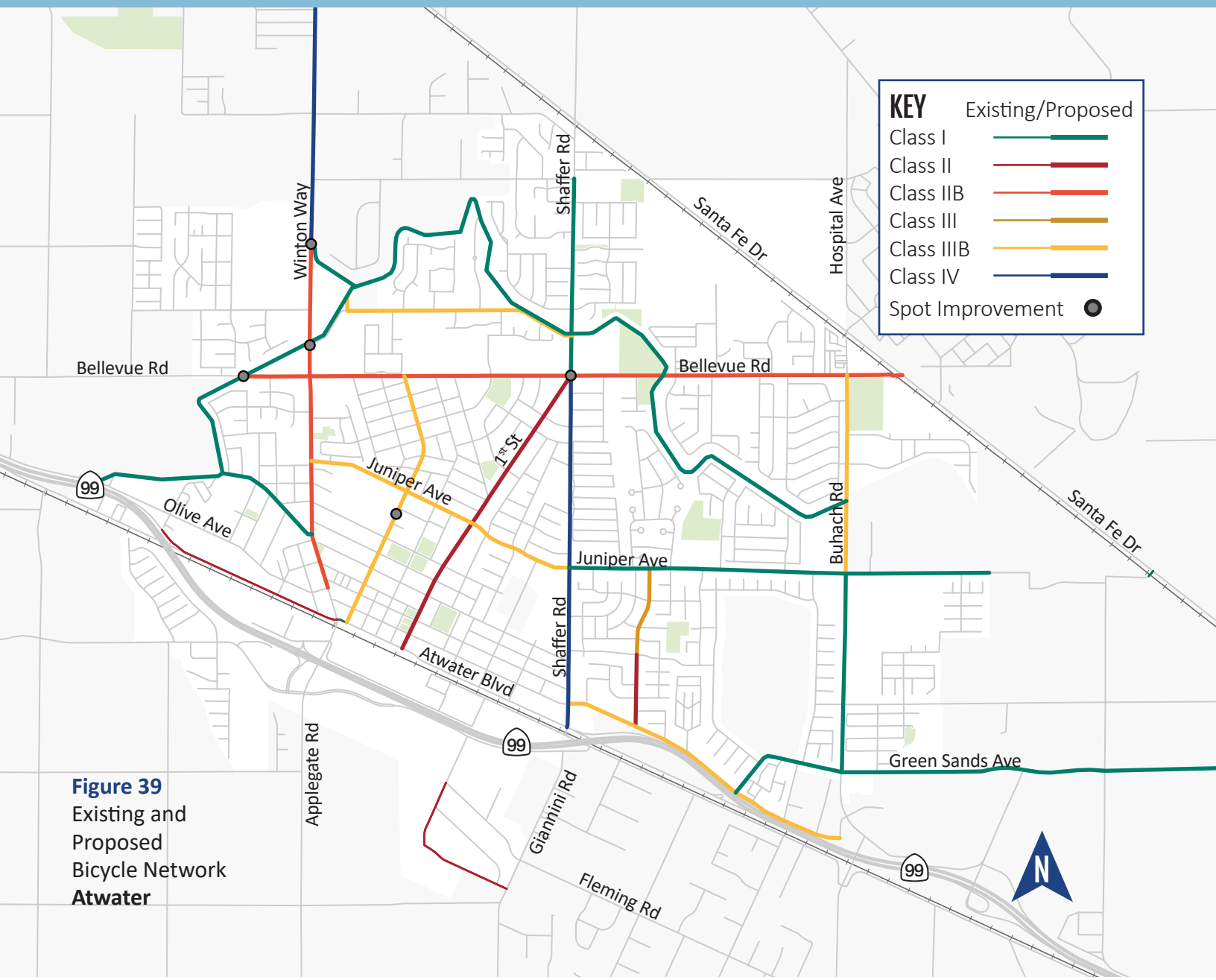


Figure 39
Existing and Proposed Bicycle Network
Atwater

Atwater

The City of Atwater has a population of 31,401 as of 2021 making it the county's third most populous city. Its population is expected to increase by 29 percent by 2046.

Atwater is located proximate to the City of Merced and to the unincorporated community of Winton. It is served by SR 99, which runs along the southern fringe of the city and connects it to the City of Merced. Winton Way is a five-lane arterial that connects Atwater to Winton. Other major corridors in Atwater include Shafter Road, Bellevue Road, Juniper Avenue, Shafter Road, Winton Way, Buhach Road, First Street, and Atwater Boulevard.

Atwater's bicycle facilities are limited to Class I shared-use paths along portions of Shaffer Road north of Bellevue Road and along Buhach Road between Juniper and Green Sands Avenues, as well as Class II bike lanes along a small stretch of Atwater Boulevard on the west side of the

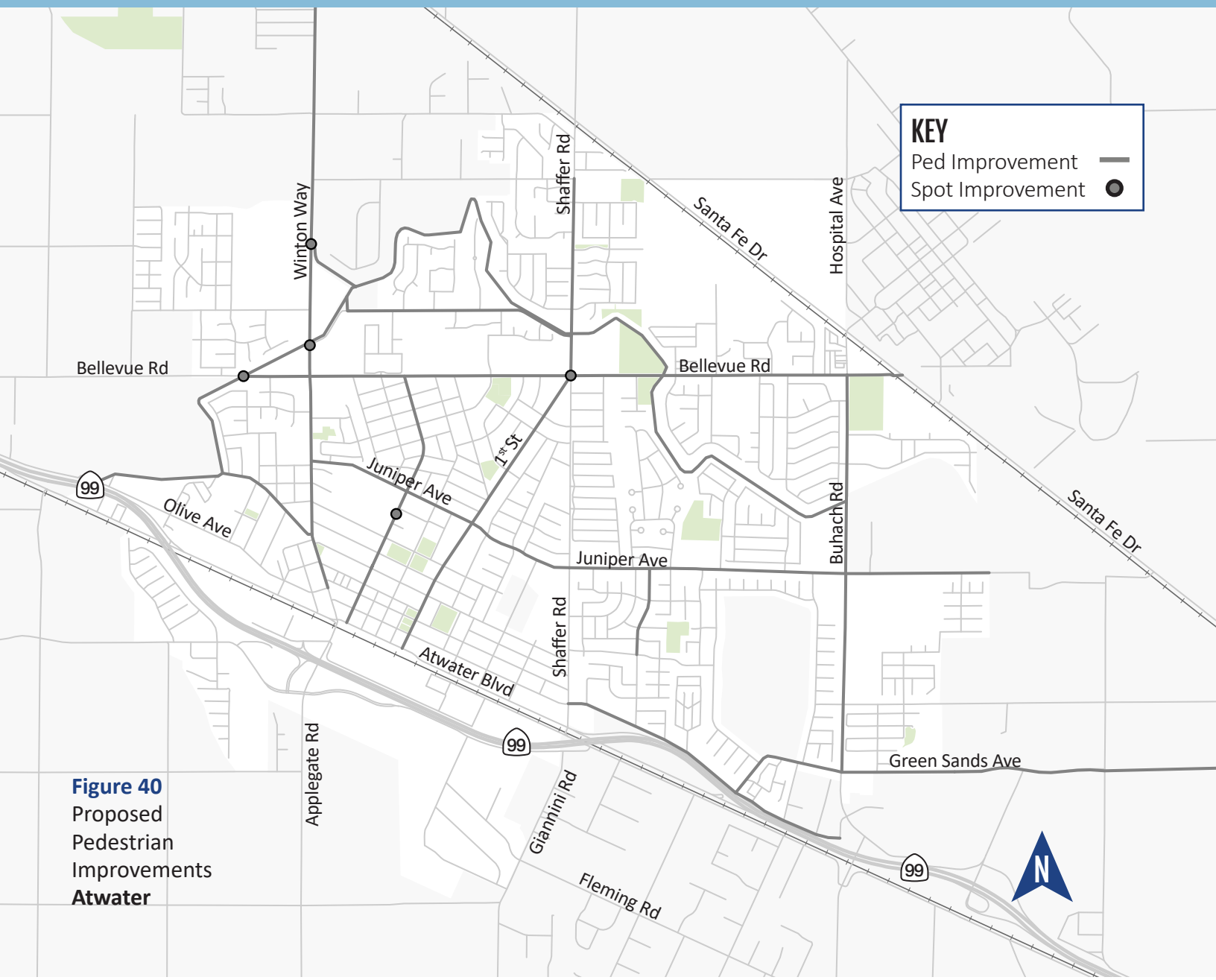


Figure 40
Proposed Pedestrian Improvements
Atwater

city. It lacks a comprehensive network of bicycle facilities that serve the whole city, and most areas in the city are not currently served by bicycle facilities.

Key activity centers in the city include the Atwater Flea Market, Castle Air Museum, Atwater Skate Park, Atwater Memorial Ballpark, and the Bellevue Bowling Alley.

Figure 41
Existing and Proposed Bicycle Network
Dos Palos and South Dos Palos

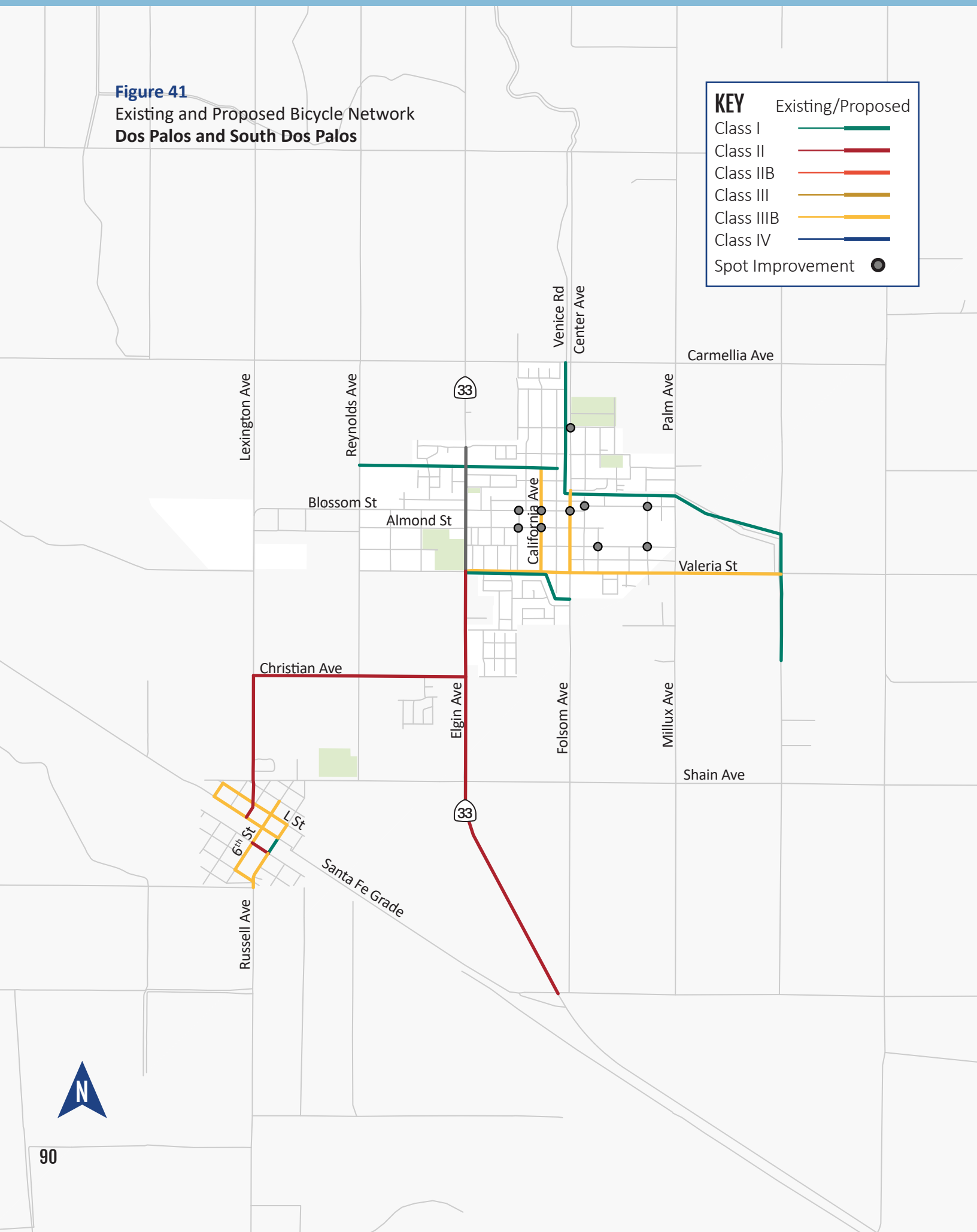
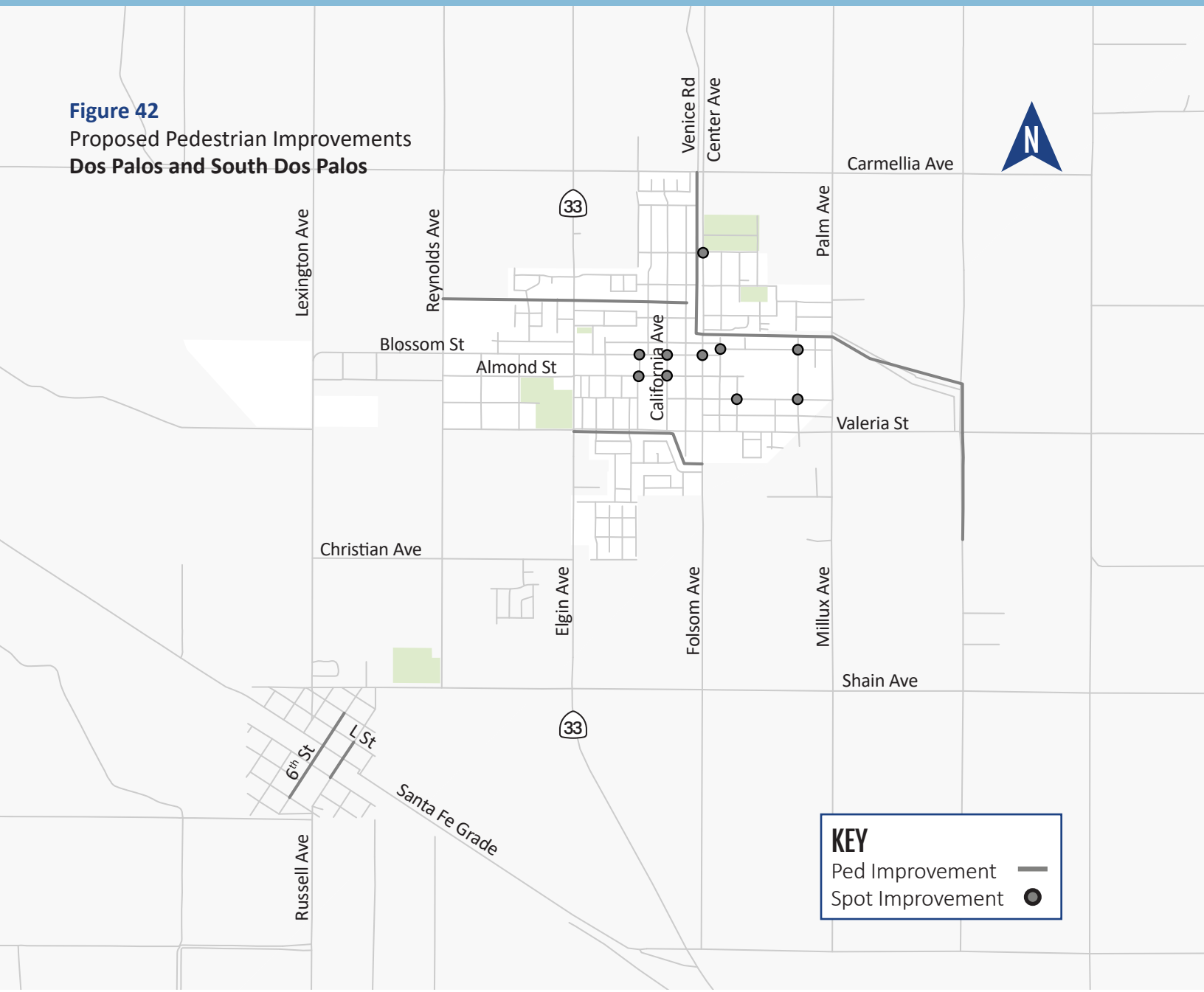


Figure 42
Proposed Pedestrian Improvements
Dos Palos and South Dos Palos



Dos Palos

The City of Dos Palos has a 2021 population of 5,651, making it the smallest incorporated city in the county. The unincorporated community of South Dos Palos is located just south.

Despite countywide investments in the county's active transportation network, Dos Palos does not have any existing bicycle facilities and limited pedestrian facilities. SR 33/Elgin Avenue is the primary highway in the city, serving both local and through traffic. It cuts through the city from the west, alternating between two and four lanes, and between speed limits of 45 and 50 miles per hour. There are no signal-controlled intersections along this stretch, and one all-way stop controlled intersection at Blossom Street.

In addition to SR 33, other primary corridors in the city include Valeria Street, Blossom Street, Center Avenue, and Almond Street.

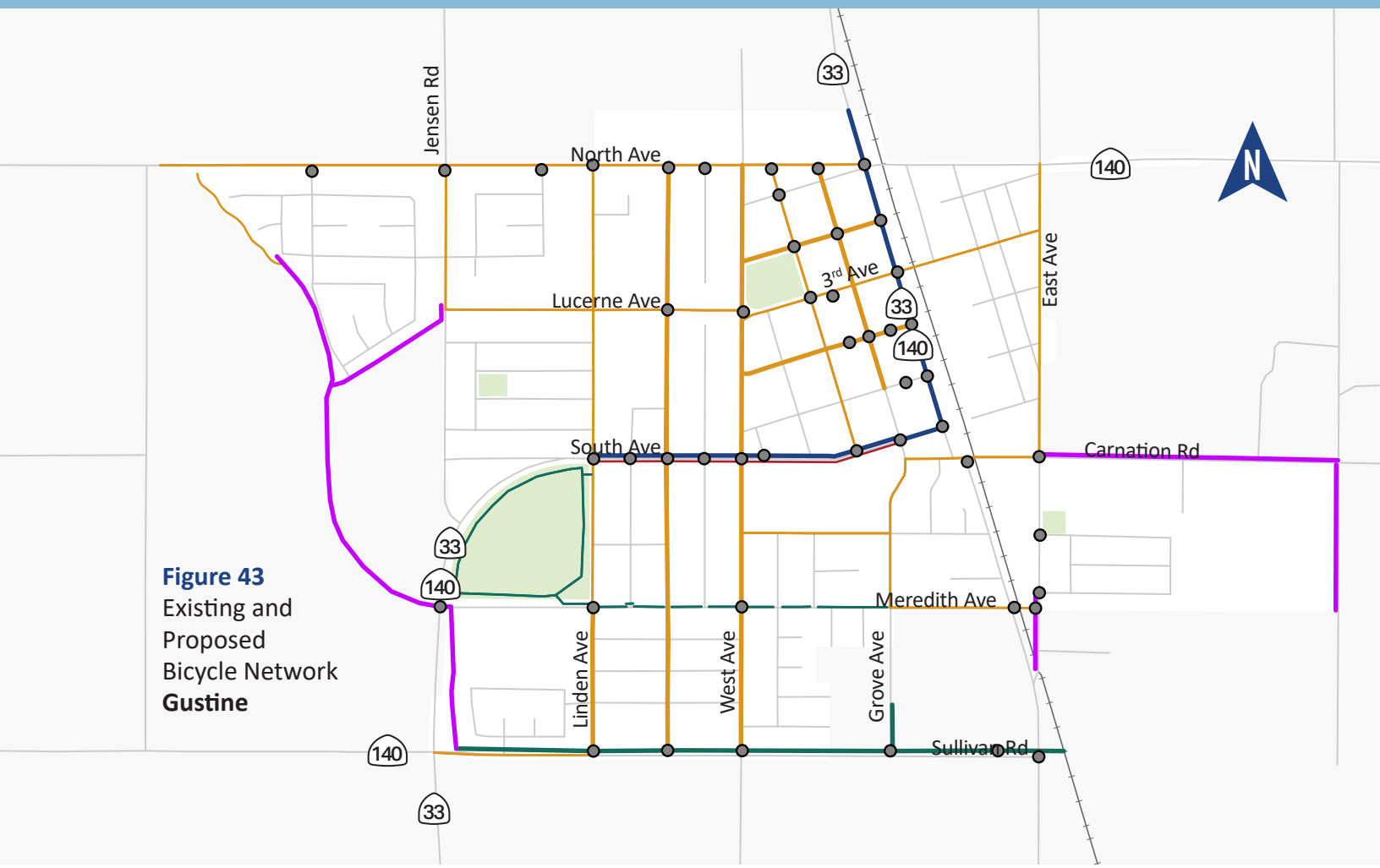


Figure 43
Existing and Proposed Bicycle Network
Gustine

KEY

	Existing/Proposed		Existing/Proposed		
Class I		Class III		Project for Further Study	
Class II		Class IIIB		Spot Improvement	
Class IIB		Class IV			

Gustine

The City of Gustine has a population of 5,990 as of 2021. The city is located in the northwest part of the county, and is located at the intersection of SR 33 and SR 140. The two highways share a single alignment through the city along South Avenue and 4th Street, which serves both through traffic and as the main local arterials. Other major roadways include North Avenue, West Avenue, and 5th Street.

While a smaller city, Gustine is home to the Gustine Municipal Airport, and is near the Kesterson National Wildlife Refuge. The city's parks and schools can be reached through some pedestrian and bicycle facilities. These include Class III bicycle routes along Sullivan Road, Linde Avenue, Meredith Avenue, Grove Avenue, East Avenue, North Avenue, West Avenue, 6th Street, and 3rd Avenue; as well as Class I shared used paths along Meredith Avenue and around Harry Schmidt Park.

The City of Gustine recently completed the development of a citywide Active Transportation Plan, which was adopted in December 2021. As such, the ATP does not include new projects for Gustine and instead defers to the locally-developed plan.

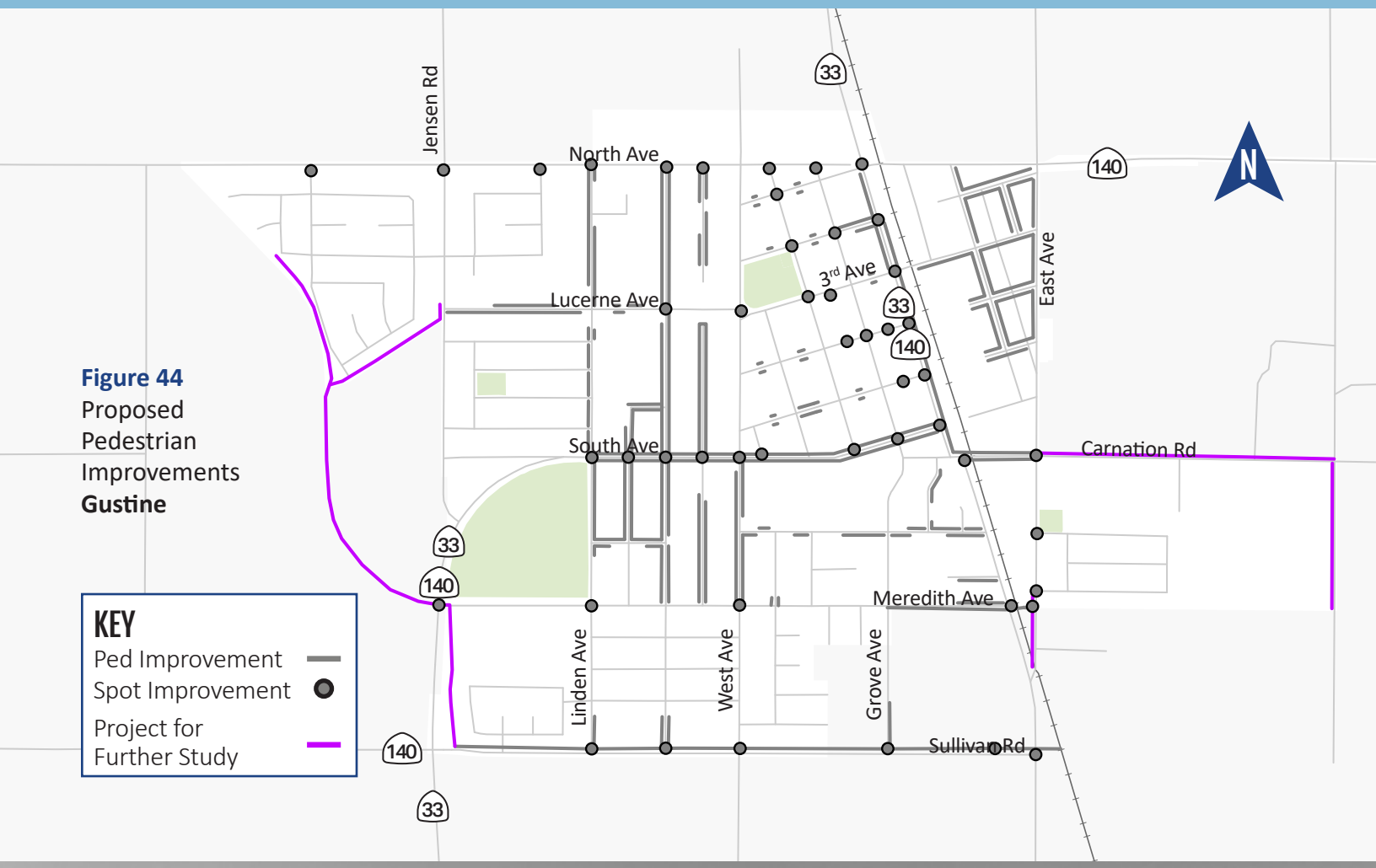


Figure 44
Proposed Pedestrian Improvements
Gustine

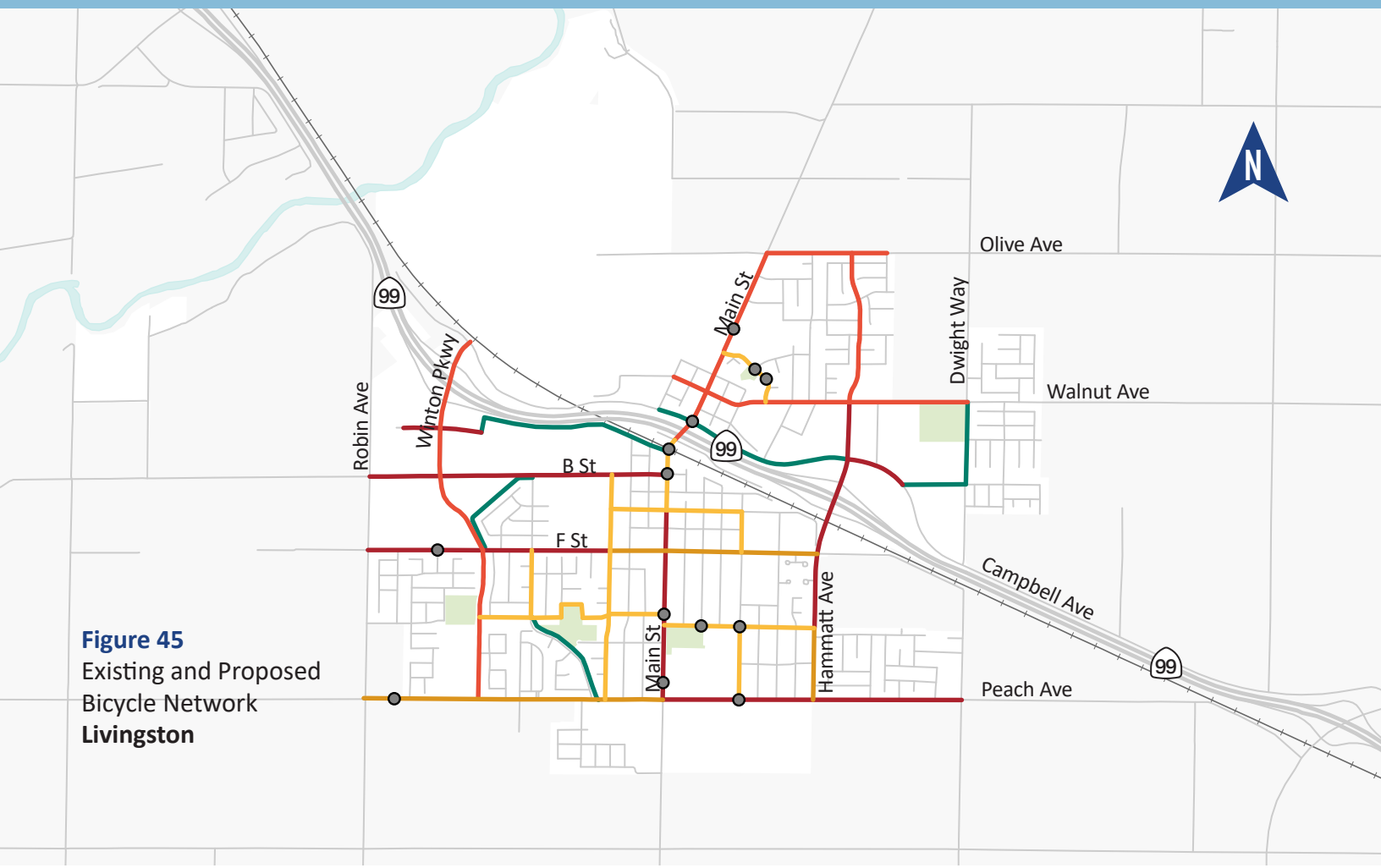


Figure 45
Existing and Proposed Bicycle Network
Livingston

KEY

	Existing/Proposed		Existing/Proposed	
Class I		Class III		Spot Improvement
Class II		Class IIIB		
Class IIB		Class IV		

Livingston

The City of Livingston has a 2021 population of 14,078. It is located in northern Merced County, northwest of Atwater. The city is served by SR 99 as its primary highway. Other key commercial corridors in the city include B Street, Winton Parkway, Main Street, Davis Street, C Street, and Hammatt Avenue.

The city has a mix of residential and commercial areas, as well as numerous parks. Small segments of Class II bike lanes have been provided on one block segments on recently widened roadways, such as B Street, but the city otherwise lacks formal bicycle facilities.

Sidewalks are provided on most residential streets. The SR 99 freeway, which bisects the city, poses a major barrier for access and connectivity between the two sides of the city. Residents also report numerous challenges with crossing SR 99, as well as issues with accessibility over the railroad tracks.

Livingston is expected to receive passenger rail service through ACE in the coming decade. The anticipated development of a platform and associated infrastructure in the downtown area underscore the need for greater pedestrian and ADA accessibility in this area.

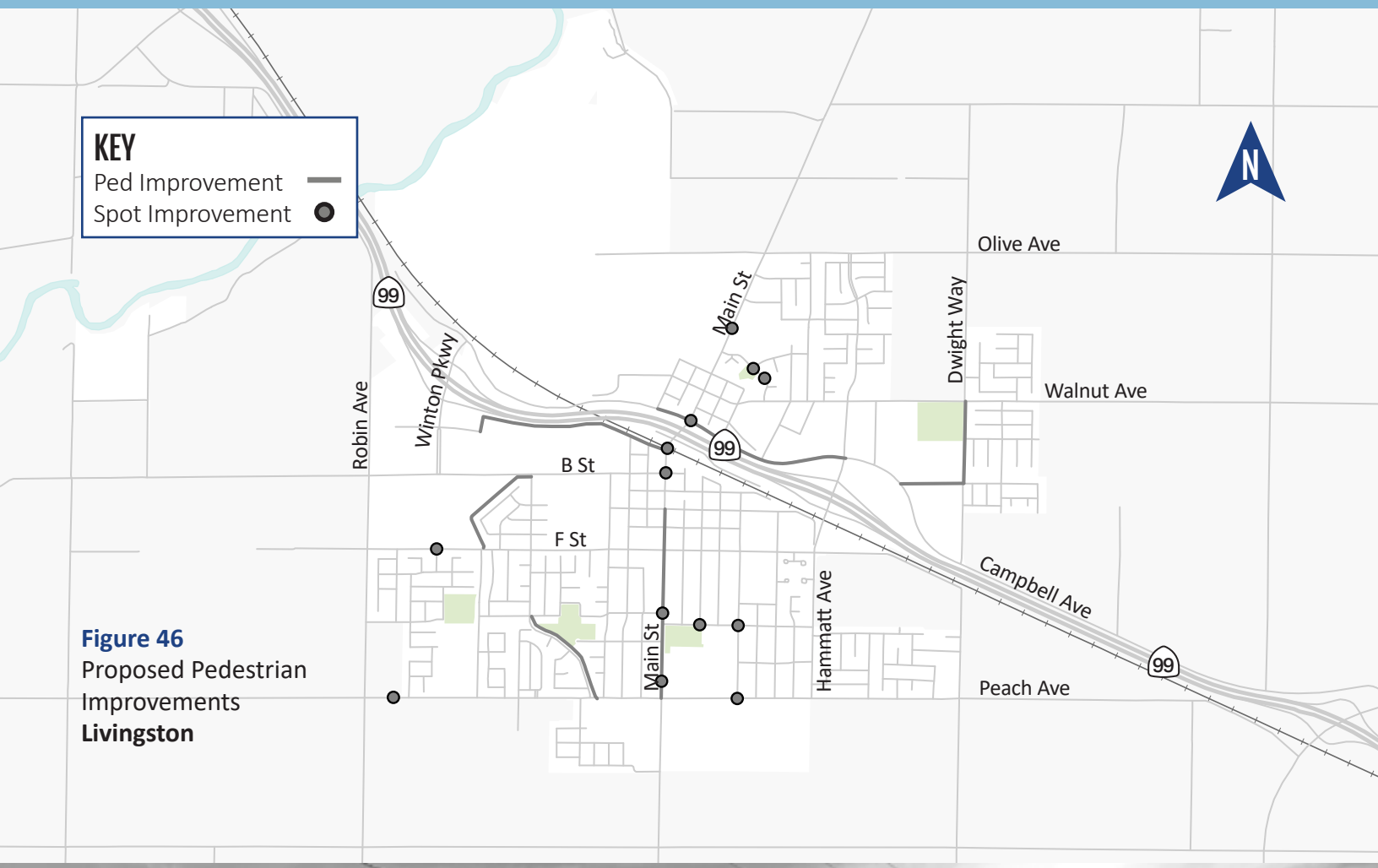


Figure 46
Proposed Pedestrian Improvements
Livingston

Los Banos

The City of Los Banos has a population of 44,421 as of 2021, making it the second largest city in the county. It is located on the west side of the county near I-5, but is directly served only by SR 165, SR 152, and SR 33. All three bisect the city on arterial roadways that serve both local and through traffic. SR 165 runs north-south along Mercey Springs Road, which cuts through the east side of the city. SR 152 and SR 33 run concurrently through the city along Pacheco Boulevard, which runs east-west, bisecting the city while also serving as its primary commercial corridor. Other major roadways in the city include Overland Avenue, West H Street / H Street, B Street, 7th Street, Ward Road, I Street, and Ortigalita Road.

Los Banos has a substantial network of bicycle facilities. Class I facilities in the city include the Rail Trail and the H.G. Fawcett Canal Trail, as well as a shared path along a stretch of Place Road. These are complemented by a network of Class II bike lanes around the city, including along B, H, and I Streets, 7th Street, Willmot Avenue, Nantes Avenue, Overland Road, and Cardoza Road. However, in many such cases, existing Class II facilities require upgrades to better match the current character of the roadways as well as travel needs of people bicycling throughout the city.

Key activity centers in and around the city include the AG Sports Complex and Dog Park, Los Banos Wildlife Area, the 7th Street Ballfields, Los Banos Historical Museum, Fairgrounds Park, and Los Banos Municipal Airport.

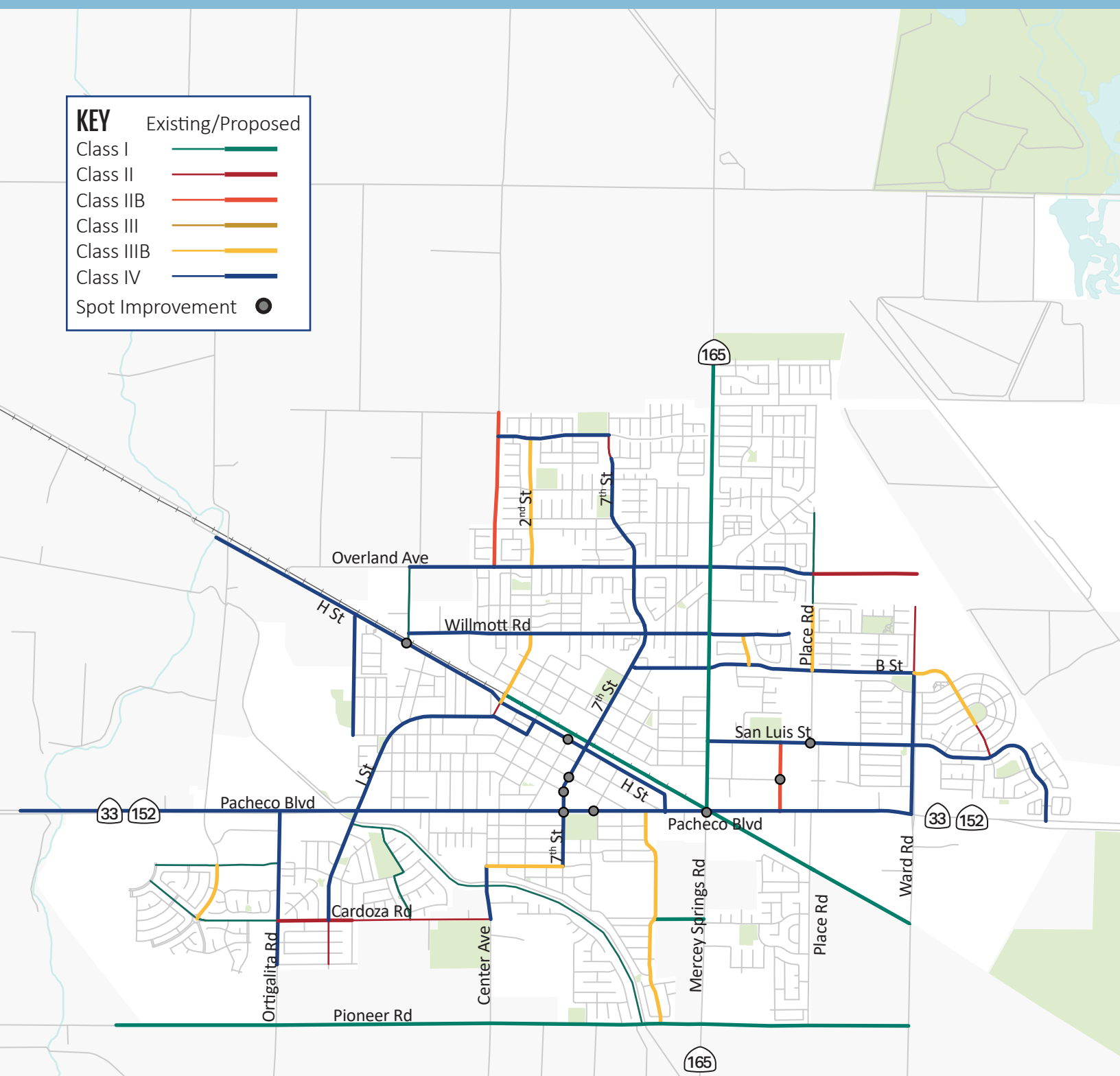
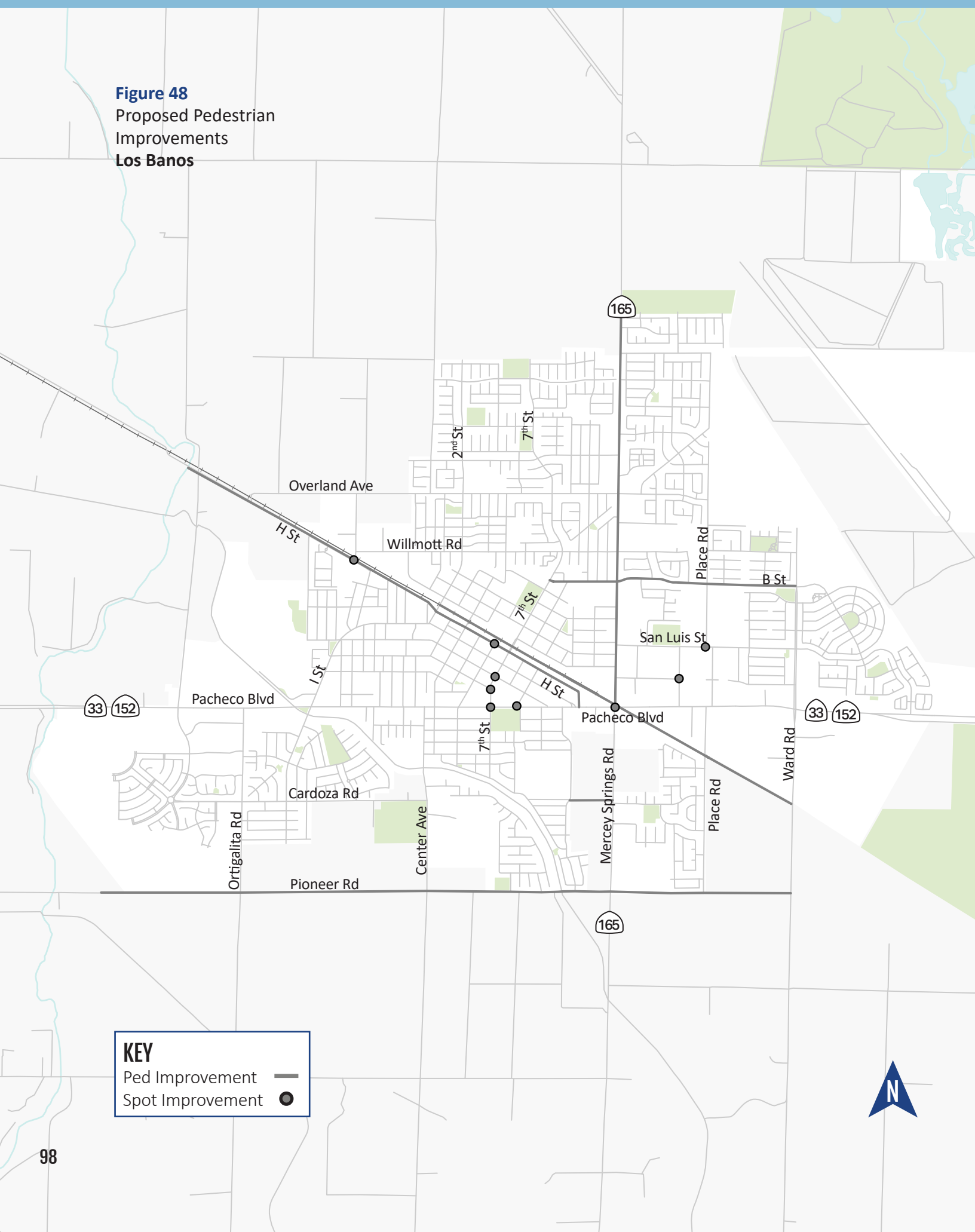


Figure 47
Existing and Proposed Bicycle Network
Los Banos

Figure 48
Proposed Pedestrian Improvements
Los Banos



Merced

The City of Merced had a population of 85,993 in 2021, making it the largest city in the county by both population size and land area. In addition to serving as the seat of Merced County and home to many of its government institutions, it is also home to the newest campus in the University of California (UC) system, UC Merced, and its attached medical center. Other key activity centers in the city include its Senior Community Center, the Applegate Park Zoo, Applegate Skate Park, Joe Herb Park and Ball Field, McNamara Park and Ball Field, Fahrens Park, Merced Flea & Farmers Market, Lake Yosemite Park, and Merced Mall. The City of Merced continues to experience geographic and population growth, especially fueled by UC Merced's continual expansion.

Merced is served by SR 99, SR 59, and SR 140. SR 99 runs along a fully controlled-access freeway alignment and is the city's main highway connection. SR 140 and SR 59 run mainly along large arterials such as Yosemite Parkway and Martin Luther King Jr. Way. However, all three highways run concurrently along the freeway segment through the central part of the city, which bisects it and creates obstacles for access and connectivity between north and south sides of the city. Other key commercial corridors in the city include 16th and 18th Streets; G, M, and R Streets; Main Street; Olive Avenue; and Yosemite Avenue.

As the biggest city in the county, Merced has the most expansive bicycle and pedestrian facilities. The city has a mix of Class I, II, and III bicycle facilities throughout the city along with a trail network connecting to recreational areas outside of the city.

A core network of class I paths are located along many of the creek corridors that travel through Merced, including segments of Bear Creek, Black Rascal Creek, Fahrens Creek, and Cottonwood Creek. These multi-use paths serve as important routes for both commuting and recreational bicycling while preserving the natural environment. Regional class I facilities on Lake Road and Campus Parkway, while located outside of city limits, nevertheless serve as important connectors for residents traveling to destinations such as the UC Merced campus.

In addition to the trail network, Class II bicycle lanes are located on many arterial streets and within new developments throughout Merced. Class II bike lanes are located on many major corridors crossing the city, including Yosemite Avenue, R Street, M Street, and G Street. In some instances, as development or adjacent land uses have changed the character of these roadways, existing Class II facilities require upgrades to better match the current character and travel needs of people bicycling throughout the city. Class II facilities are located on Buena Vista Drive, W Olive Avenue, McKee Road, W 26th Street, Glen Avenue, E 21st Street, W Main Street, E 13th Street, E 11th Street, and W 8th Street.

Existing Class III bicycle routes are located throughout the city and are found on sections of both collectors and arterials, despite only being appropriate for lower speed streets, such as in residential areas, to serve specific destinations such as schools or to close gaps in the broader bicycle network. Class III facilities are found on Bellevue Road, Lake Road, G Street, M Street, Cardella Road, San Jose Avenue, Mercy Avenue, Mansionette Drive, Yosemite Ave, McKee Road, W 21st Street, W 18th Street, E Main Street, W 13th Street, W 11th Street, R Street, V Street, N West Avenue, and W Childs Avenue. Community feedback reflect that some of these routes have not been able to provide sufficiently comfortable user experience for bicyclists.

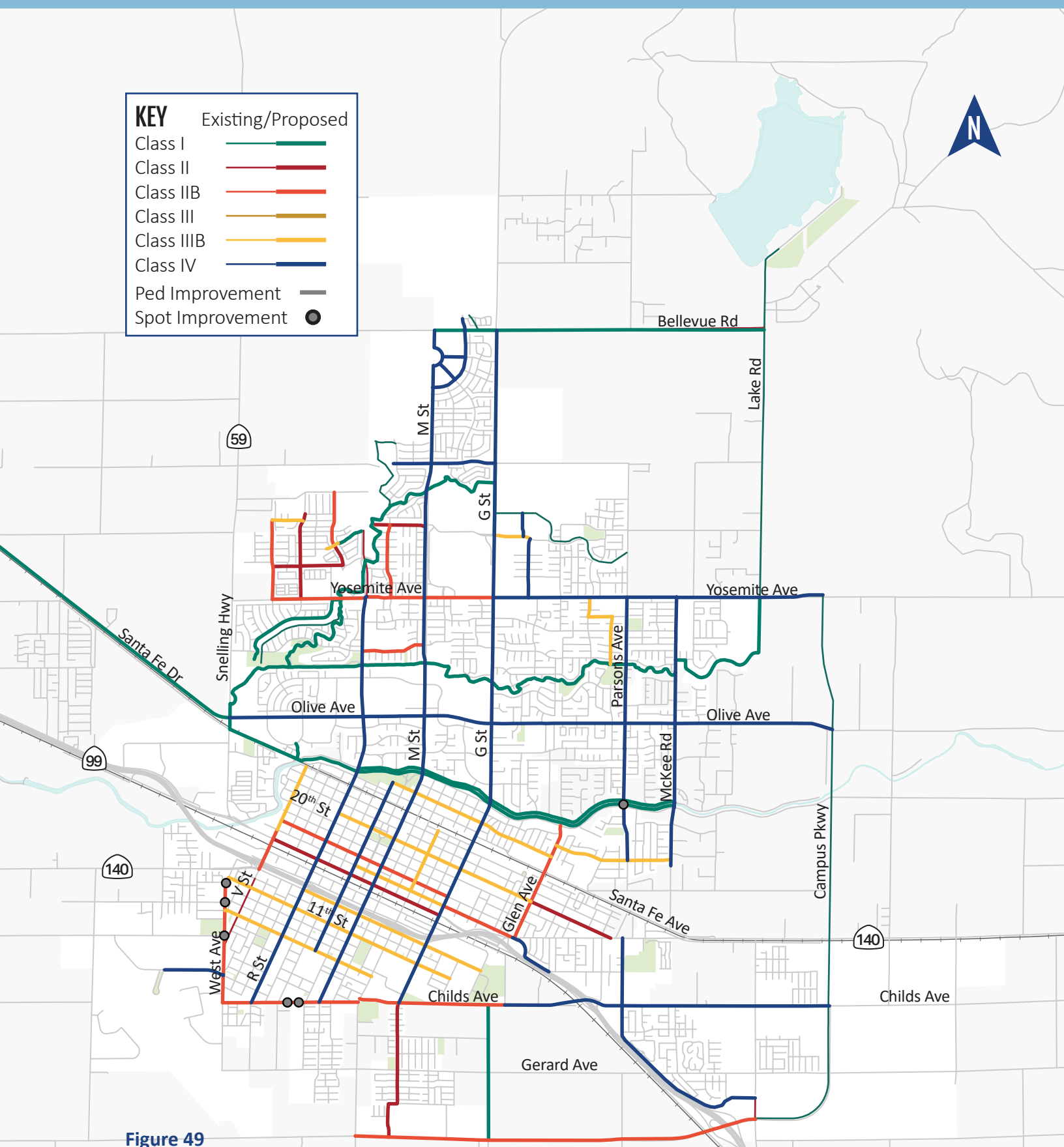


Figure 49
Existing and Proposed
Bicycle Network
City of Merced

Figure 49
Proposed Pedestrian Improvements
City of Merced

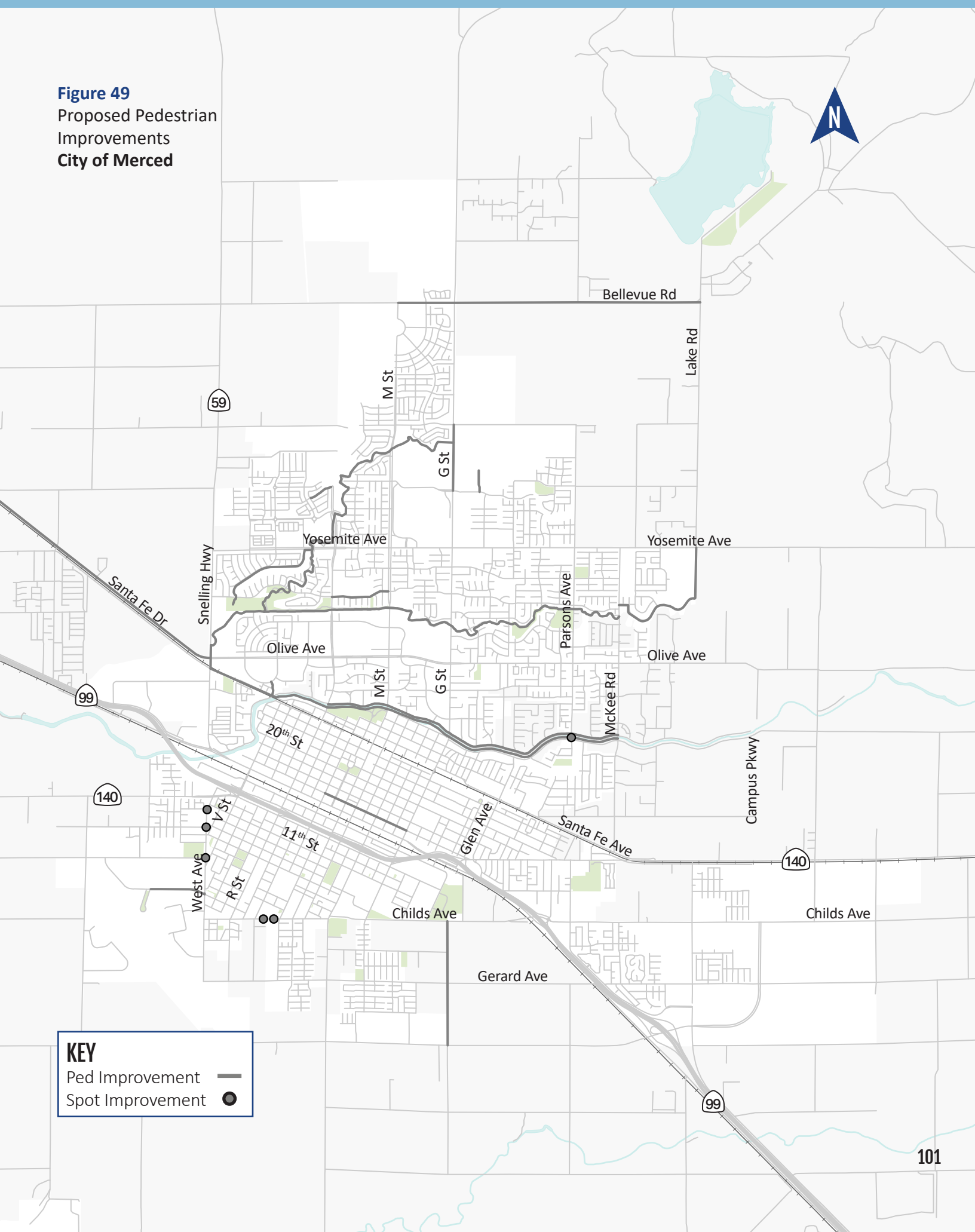
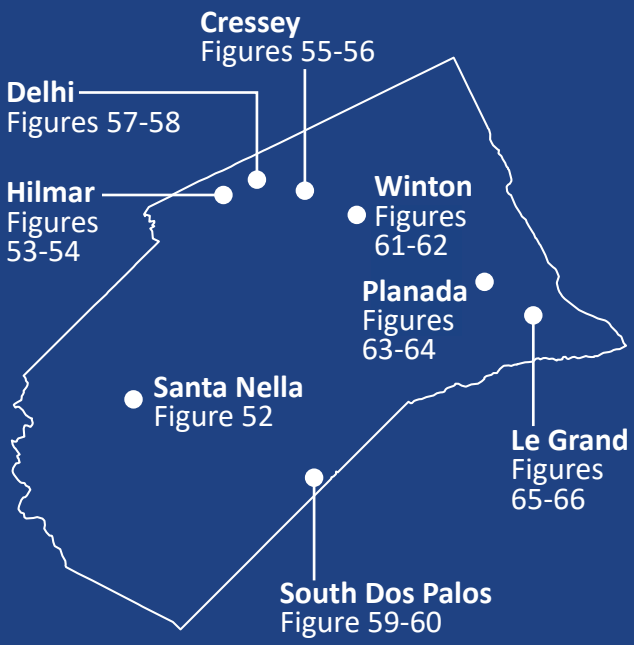


Figure 51
Unincorporated Communities with Proposed Improvements



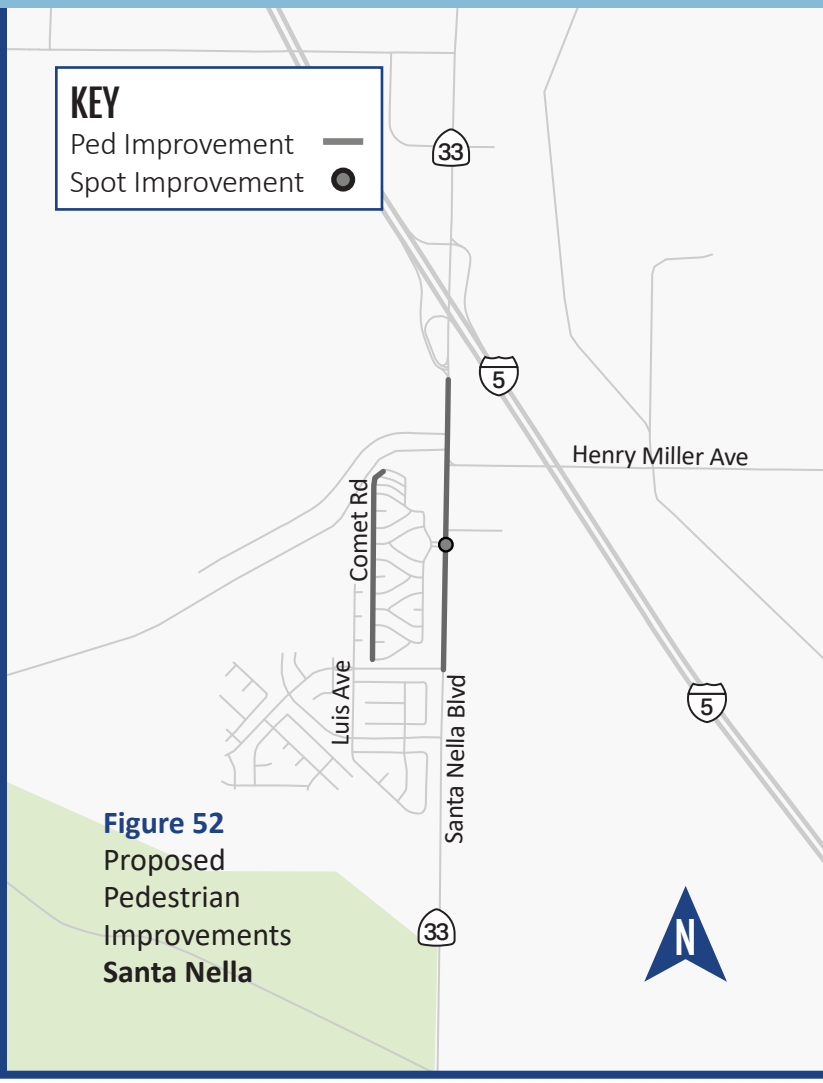


Figure 52
Proposed Pedestrian Improvements
Santa Nella

Merced County

The unincorporated portion of Merced County has an approximate population of 91,616. Most of that population resides within a number of small, unincorporated communities, including Ballico, Cressey, Delhi, Franklin-Beachwood, Hilmar, Le Grand, McSwain, Planada, Santa Nella, Snelling, South Dos Palos, Stevinson, Volta, and Winton.

Each of the unincorporated communities serves as major activity centers for their residents and have one to two major corridors per community connecting commercial activity, residential areas, parks, and schools. Many major corridors connect multiple unincorporated communities including Santa Fe Drive, Winton Way, Santa Fe Avenue, Henry Miller Avenue, Bradbury Road, and August Avenue. These communities are also served by highways, including SR 140, SR 33, SR 59, SR 165, SR 99, and I-5, which also serve the incorporated cities.

Focused community plans with an active transportation emphasis have been recently undertaken for the Winton and Franklin-Beachwood communities, which have resulted in the planning and ongoing implementation of a variety of improvements, with many focused around safe routes to schools.

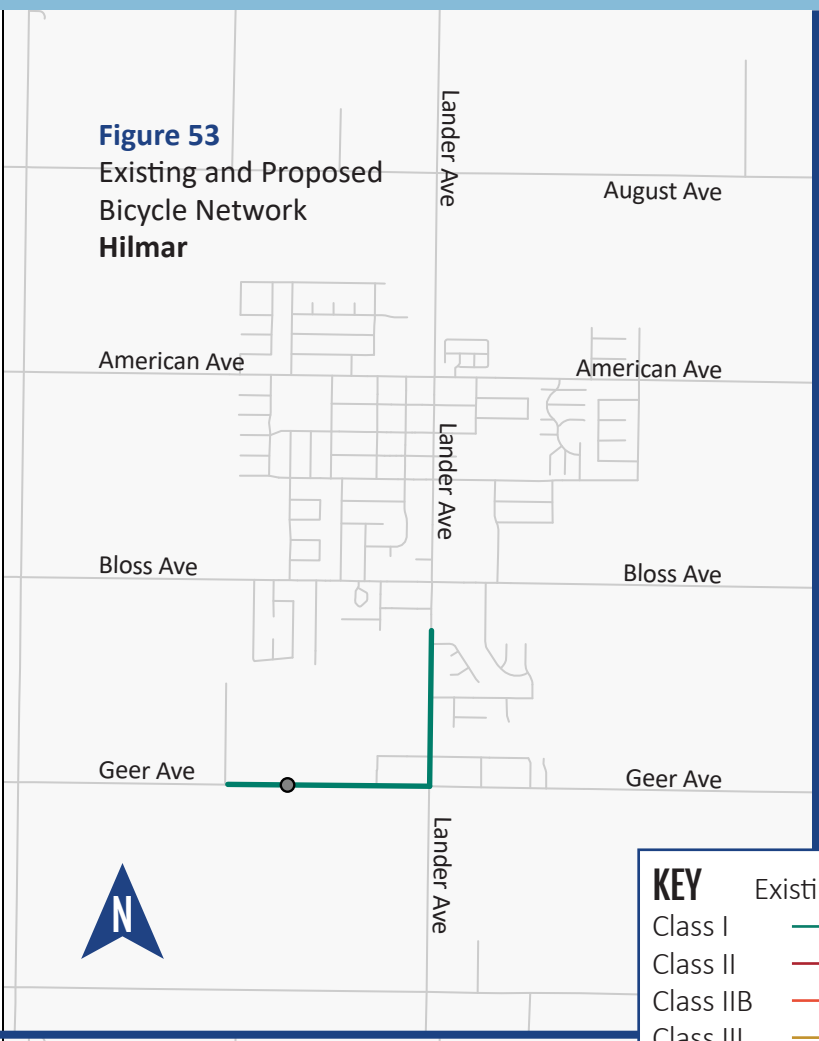


Figure 53
Existing and Proposed
Bicycle Network
Hilmar

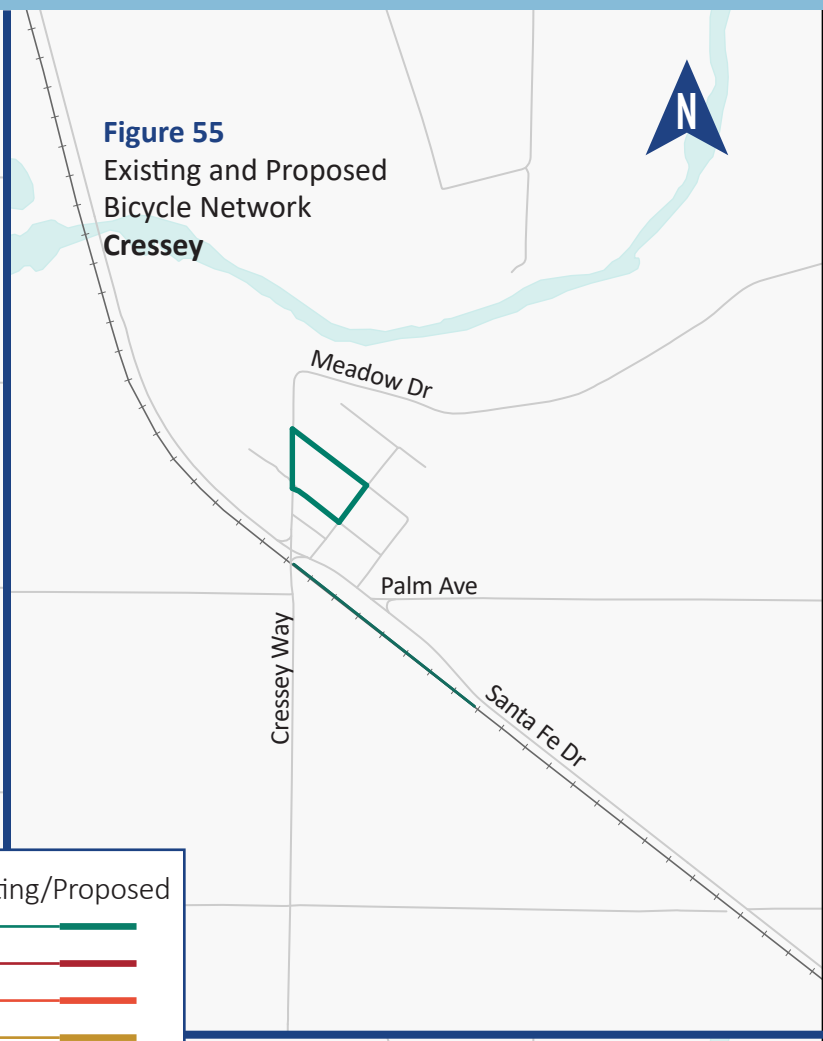
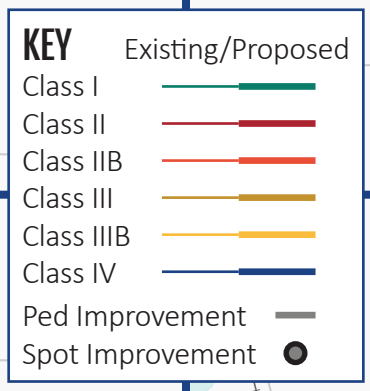


Figure 55
Existing and Proposed
Bicycle Network
Cressey



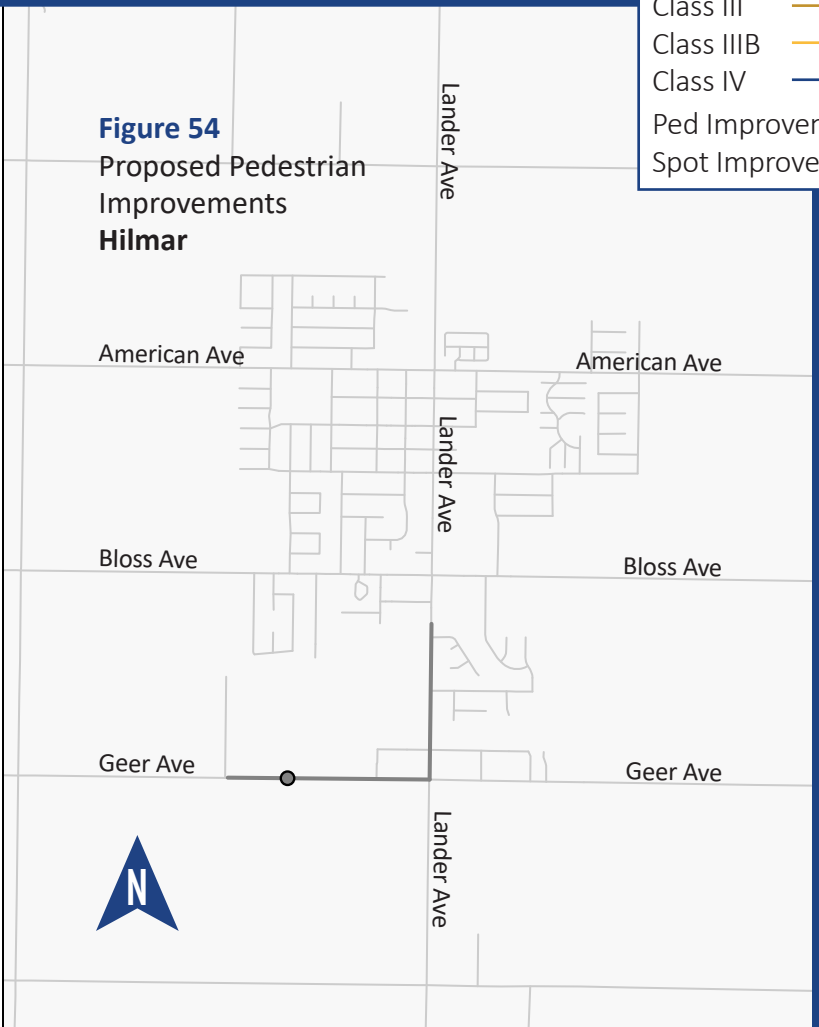


Figure 54
Proposed Pedestrian
Improvements
Hilmar

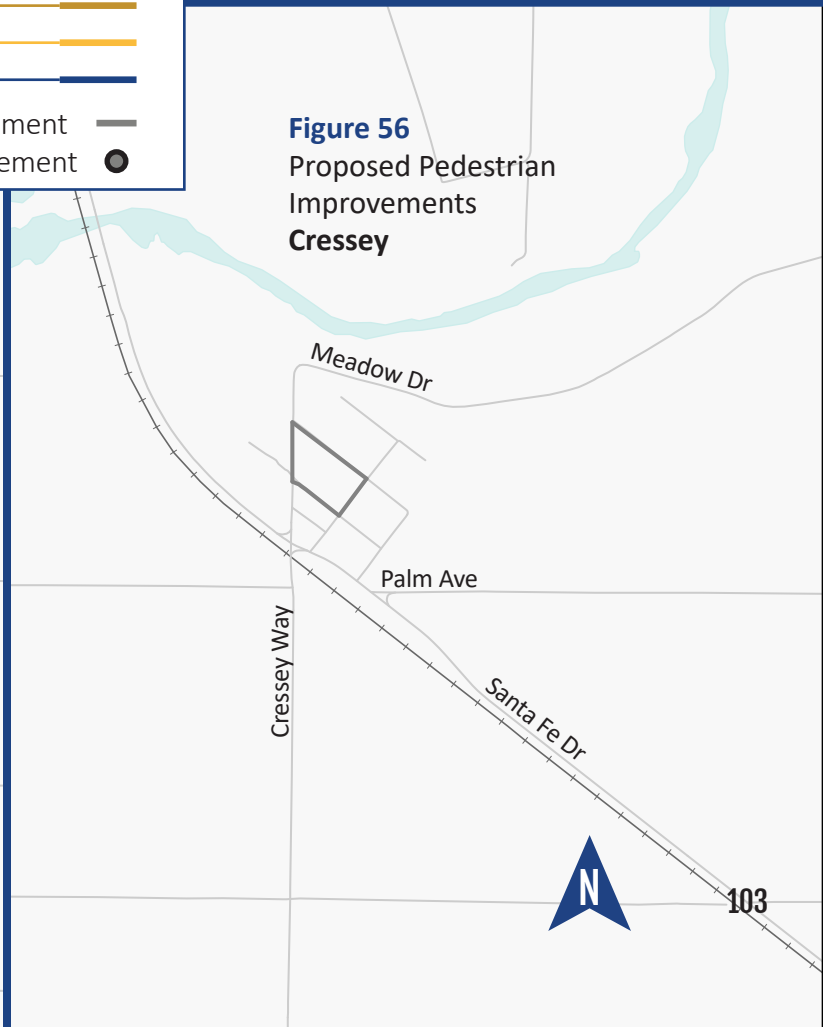


Figure 56
Proposed Pedestrian
Improvements
Cressey

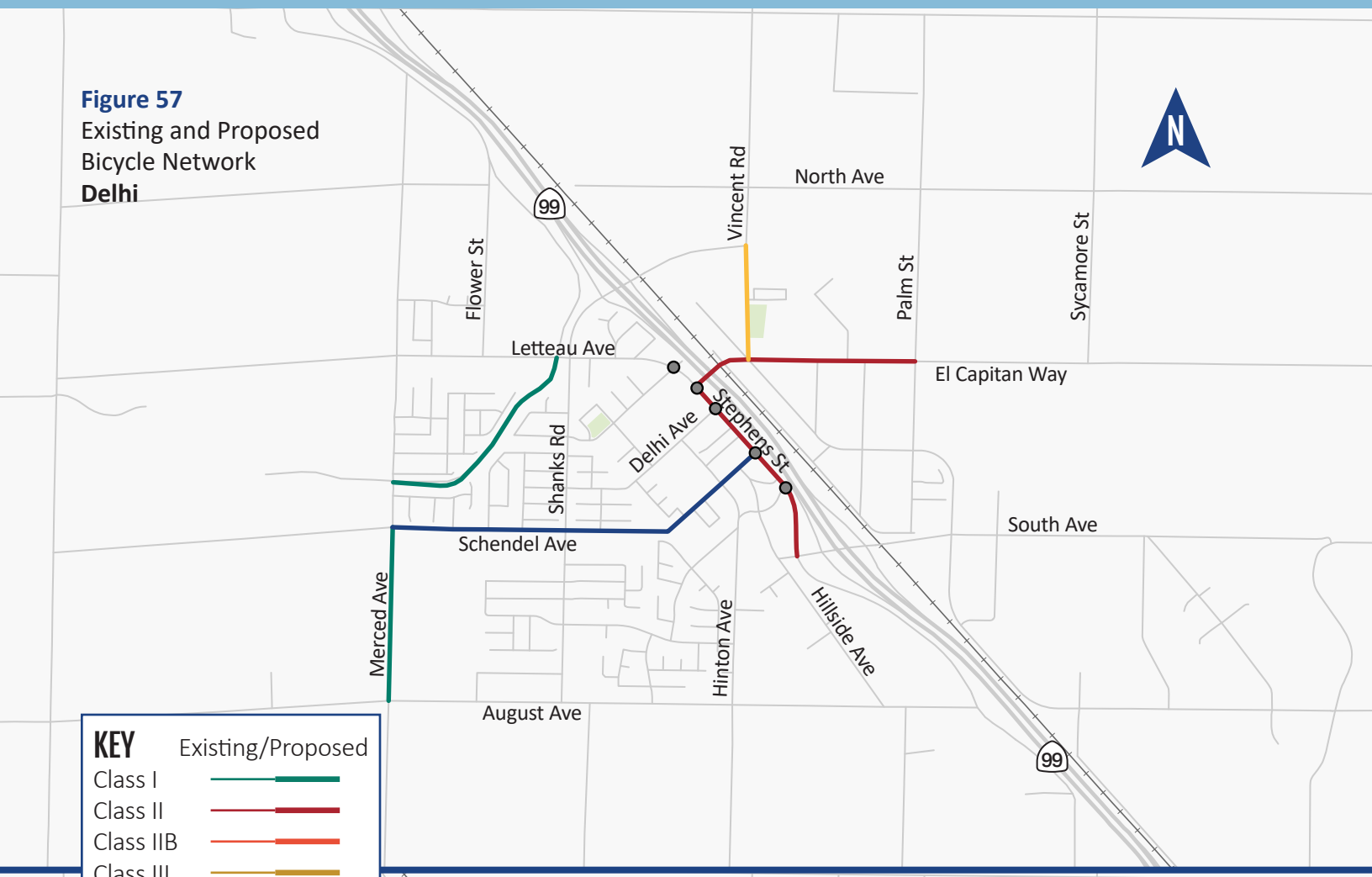


Figure 57
Existing and Proposed Bicycle Network
Delhi

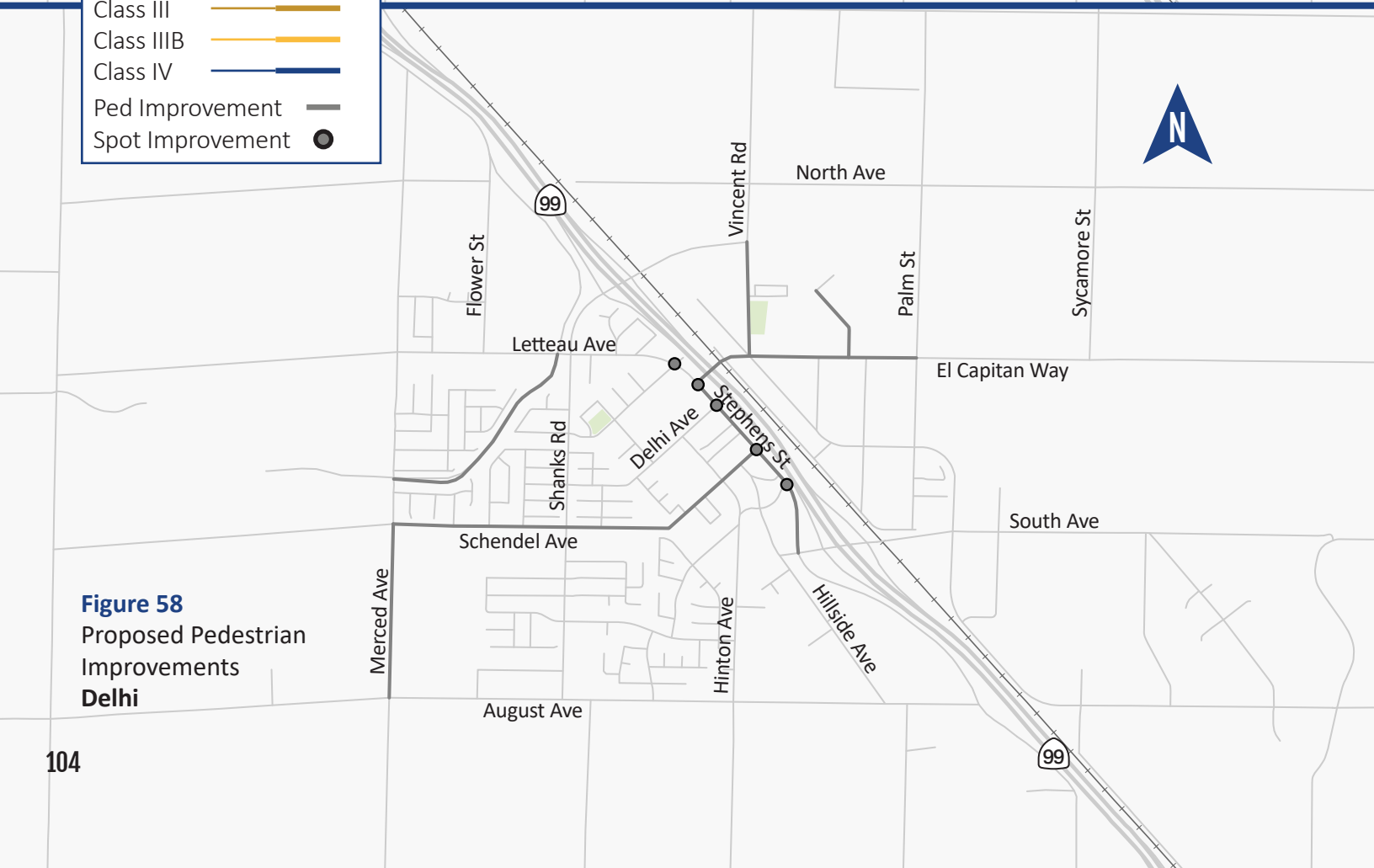


Figure 58
Proposed Pedestrian Improvements
Delhi

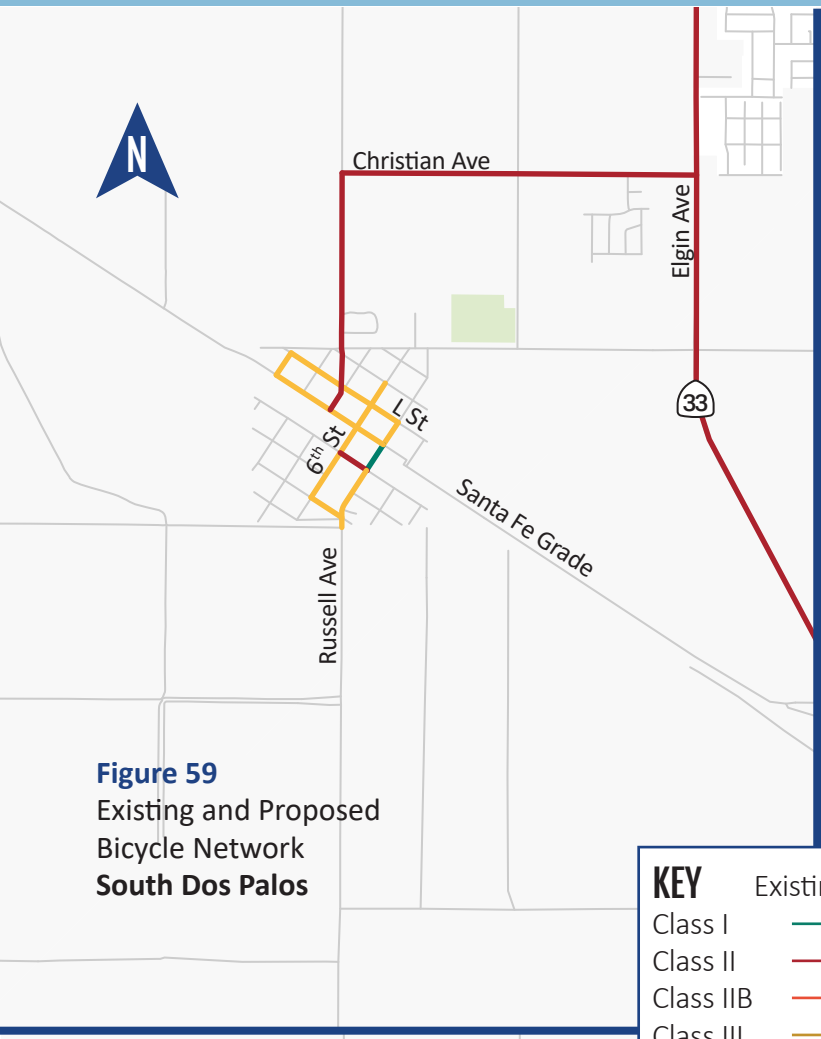


Figure 59
Existing and Proposed
Bicycle Network
South Dos Palos

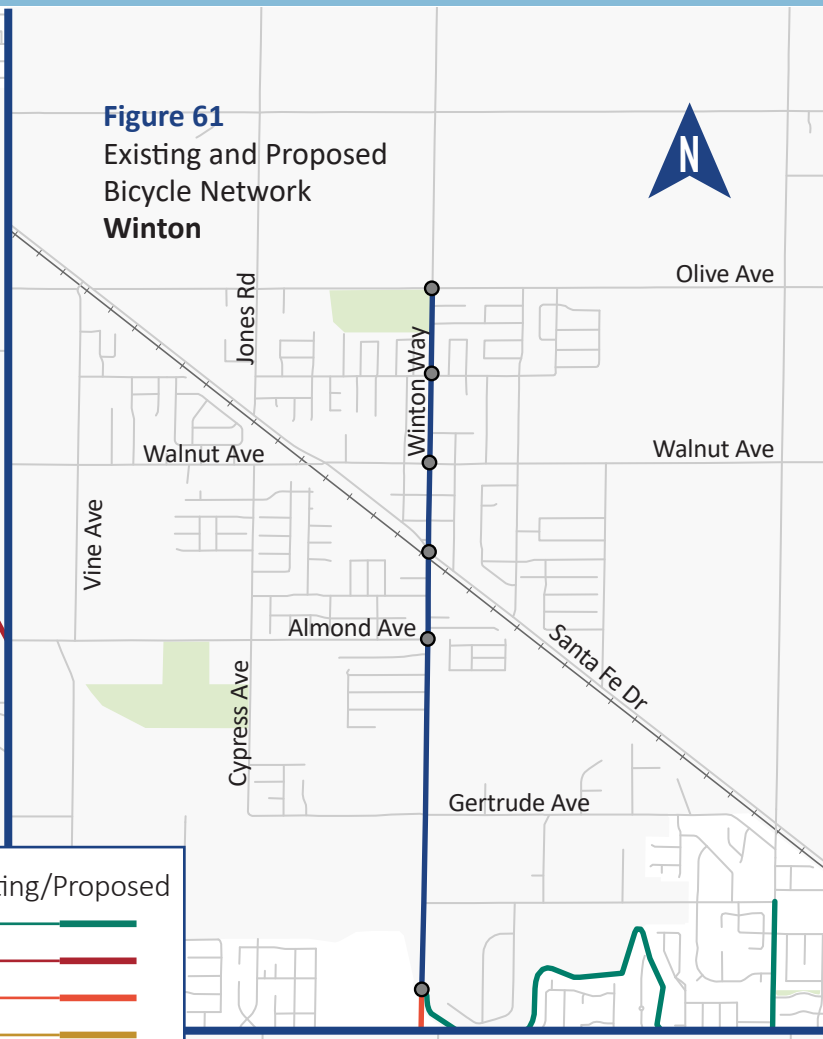


Figure 61
Existing and Proposed
Bicycle Network
Winton

KEY Existing/Proposed

- Class I
- Class II
- Class IIB
- Class III
- Class IIIB
- Class IV
- Ped Improvement
- Spot Improvement

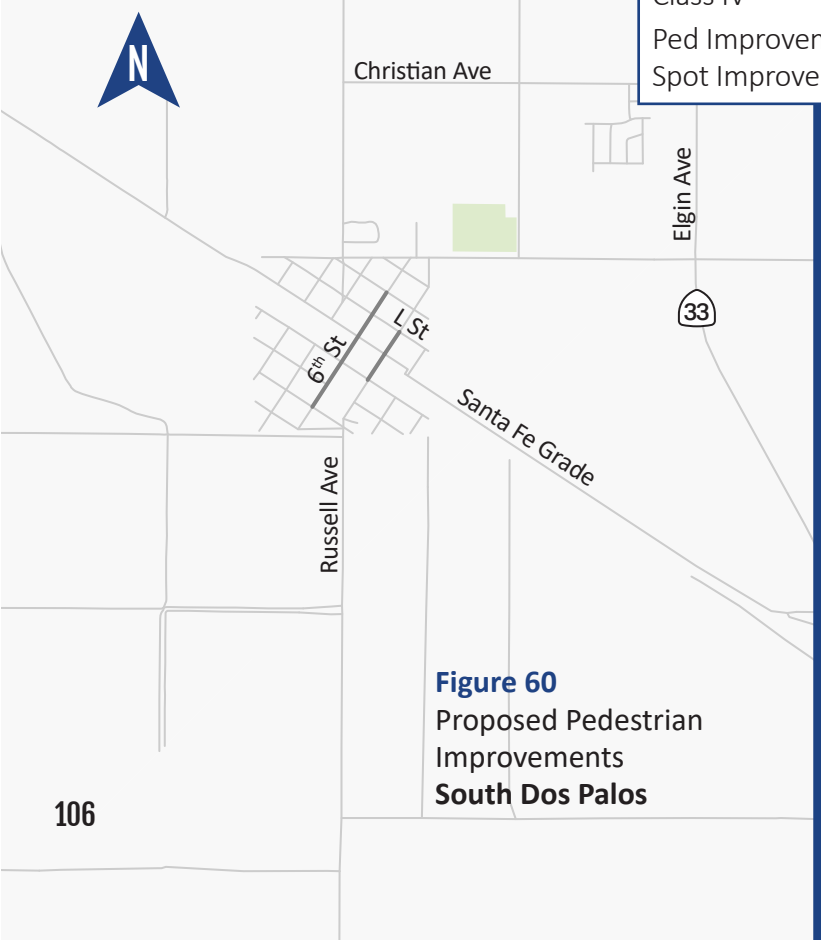


Figure 60
Proposed Pedestrian
Improvements
South Dos Palos

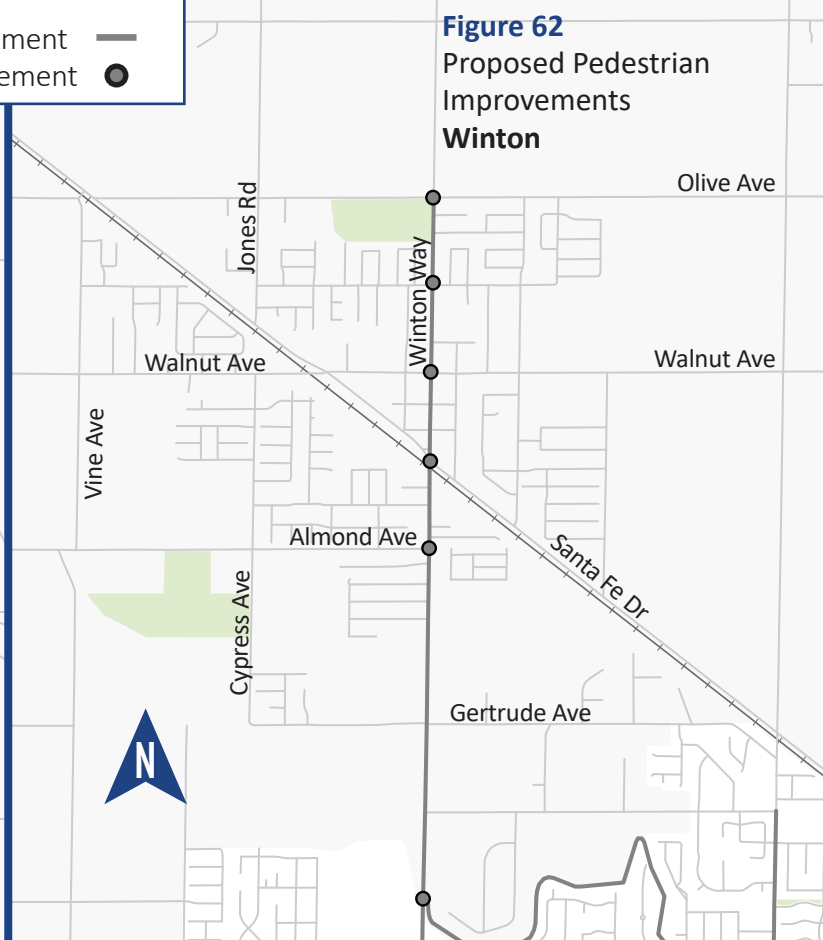


Figure 62
Proposed Pedestrian
Improvements
Winton

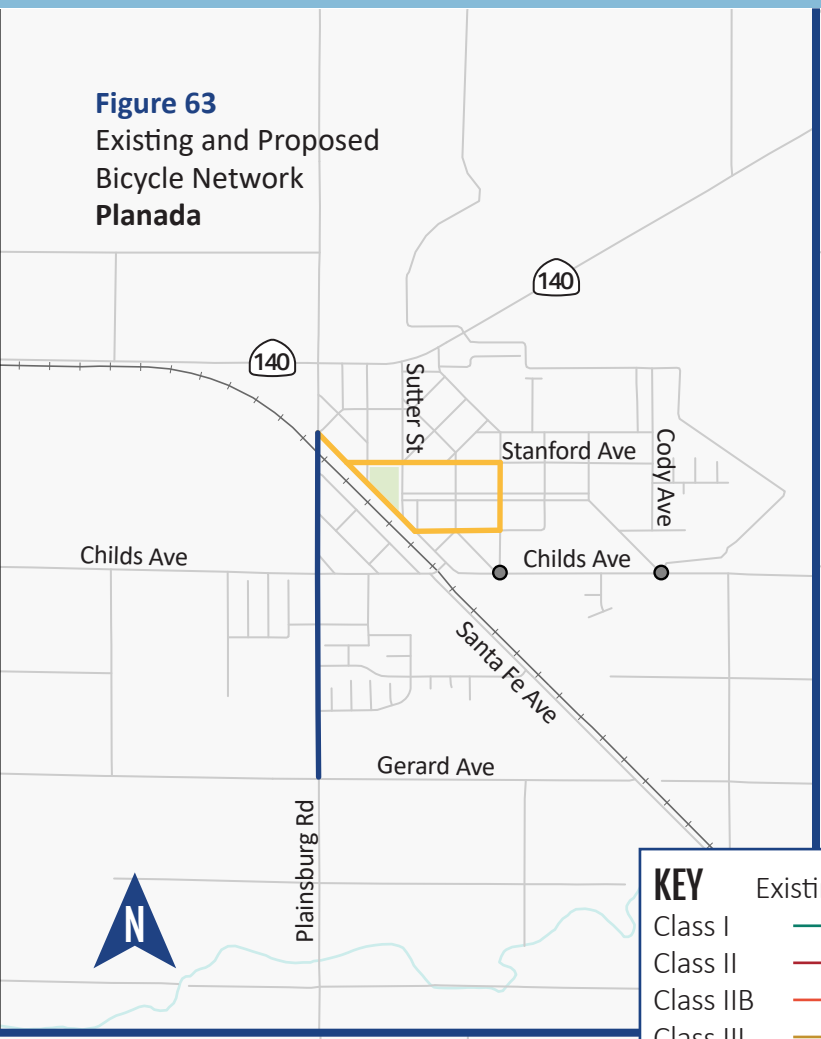


Figure 63
Existing and Proposed
Bicycle Network
Planada

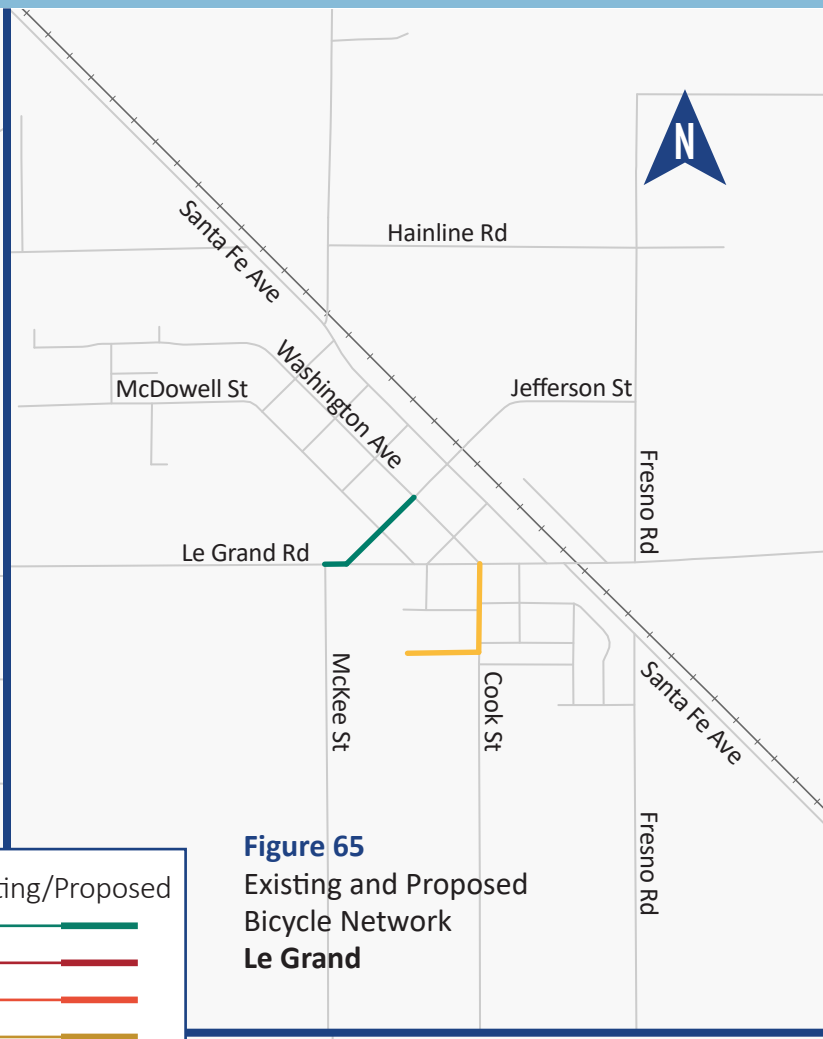


Figure 65
Existing and Proposed
Bicycle Network
Le Grand

KEY Existing/Proposed

- Class I
- Class II
- Class IIB
- Class III
- Class IIIB
- Class IV
- Ped Improvement
- Spot Improvement

Figure 64
Proposed Pedestrian
Improvements
Planada

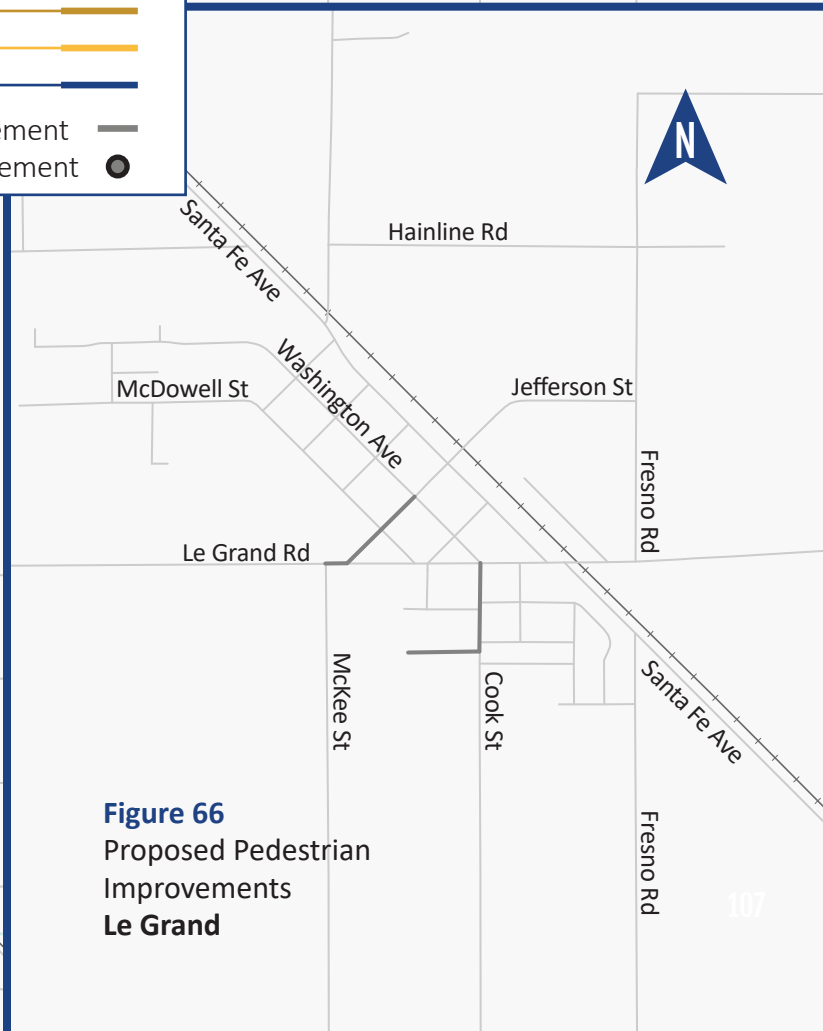


Figure 66
Proposed Pedestrian
Improvements
Le Grand


6

Implementation & Accountability

The active transportation network will be implemented in a few ways:

- through individual projects;
- in conjunction with adjacent land development projects; and
- in conjunction with maintenance and other capital projects.

Recommendations in this report will be implemented by local jurisdictions and through coordination and collaboration with MCAG and other partners, including Caltrans, the San Joaquin Regional Rail Commission (ACE Rail), the San Joaquin Joint Powers Authority (SJJPA), the California High-Speed Rail Authority (CHSRA), Amtrak, and other advocacy and community organizations in Merced County and throughout the Central Valley.

Completion of projects in this plan will be reported through periodic reports on completion by jurisdiction staff to the city councils and board of supervisors, and on each agency's website. MCAG will periodically update this plan to reflect the evolving needs and progress towards completion.

As discussed previously, implementation will depend on the availability of funding and in some cases occur over many years, with priority projects being targed for implementation in the next five years. This chapter provides an overview of available funding sources at the time of publication, along with recommendations for ongoing collaboration and accountability.

Funding

Multiple federal, state, regional, and local funding sources are available for bicycle and pedestrian projects and programs. A full resource table is provided in **Table 9**. Some of the funding sources most relevant to this plan include the following:

Measure V is a half-cent regional transportation sales tax measure that is designed to fund transportation maintenance and improvements in the Merced region. Local jurisdictions must spend at least 20 percent of their local Measure V funding on alternative mode projects, such as bicycle and pedestrian projects. As such, this plan may be used as a resource to identify these projects.

The *Active Transportation Program (ATP)* consolidates diverse transportation initiatives into a single program with an annual budget of around $123 million from state and federal sources. ATP aims to increase walking and biking trips, enhance safety for non-motorized users, support regional greenhouse gas reduction efforts, promote public health, and provide a range of projects benefiting various user groups, including disadvantaged communities.

Sustainable Transportation Planning Grants are offered by Caltrans to encourage local and regional planning goals that support the implementation of Regional Transportation Plan and Sustainable Communities Strategies (RTP/SCS) projects. These funds can be used for a variety of focused community planning projects, including those that support rural active transportation, temporary demonstration projects, and community needs assessments.

The *Congestion Mitigation and Air Quality Improvement (CMAQ) Program* allocates funds to states for transportation projects aimed at alleviating traffic congestion and enhancing air quality, especially in regions of the country struggling to meet national air quality standards.

The *Highway Safety Improvement Program (HSIP)* is a federal-aid initiative designed to achieve a significant reduction in traffic fatalities and serious injuries across all public roads, including non-state-owned roads and tribal land. California's Local HSIP focuses on infrastructure projects with recognized crash reduction benefits. Funding can be used for preliminary engineering, right of way, and construction.

The *Safe Streets and Roads for All (SS4A)* grant program has a budget of $5 billion in appropriated funds spanning from 2022 to 2026. The SS4A program supports regional, local, and tribal endeavors through grants to prevent roadway fatalities and severe injuries. Projects with a direct link to bicycle and pedestrian safety will be eligible for funding as the MCAG Multijurisdictional Local Road Safety Plan is completed in 2024.

Local Development Fees collected on land development projects can provide match funding or full implementation of projects where there is a nexus to the project.

Federal and State Earmarks present an opportunity to secure funding at both the federal and state level. Earmarks often have short timelines for consideration; proactively creating fact sheets with funding needs and benefits of potential projects can support engagement with Federal and State legislators.

Table 9
Relevant Local, Statewide, and Federal Funding Sources

LOCAL FUNDING SOURCES	
Measure V	https://www.mcagov.org/315/Measure-V
STATEWIDE FUNDING SOURCES	
Affordable Housing and Sustainable Communities (AHSC)	https://sgc.ca.gov/programs/ahsc/
Active Transportation Program (ATP)	https://catc.ca.gov/programs/active-transportation-program
Clean California (Clean CA)	https://cleancalifornia.dot.ca.gov/
Local Highway Safety Improvement Program (HSIP)	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program
Local Partnership Program (LPP)	https://catc.ca.gov/programs/sb1/local-partnership-program
Reconnecting Communities: Highways to Boulevards (RC:H2B)	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/rc-h2b
Road Maintenance and Rehabilitation Account (RMRA) & Highway Users Tax Account (HUTA)	https://sco.ca.gov/aud_road_maintenance_sb1.html
Solutions for Congested Corridors Program (SCCP)	https://catc.ca.gov/programs/sb1/solutions-for-congested-corridors-program
Sustainable Transportation Planning (STP) Grant	https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants
FEDERAL FUNDING SOURCES	
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	https://arb.ca.gov/resources/documents/congestion-mitigation-and-air-quality-improvement-cmaq-program
Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT)	https://www.transportation.gov/rural/grant-toolkit/promoting-resilient-operations-transformative-efficient-and-cost-saving
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	https://transportation.gov/RAISEgrants
Reconnecting Communities and Neighborhoods Grant Program	https://www.transportation.gov/grants/rcnprogram
Rural Surface Transportation Grant (RSTG)	https://transportation.gov/grants/rural-surface-transportation-grant
Strengthening Mobility and Revolutionizing Transportation (SMART)	https://transportation.gov/grants/SMART
Safe Streets and Roads for All (SS4A)	https://transportation.gov/grants/SS4A
Surface Transportation Block Grant (STBG)	https://fhwa.dot.gov/specialfunding/stp/

Potential Outcomes

By implementing the planned networks and supporting programs, significant improvements may be realized in the share of trips made by walking or bicycling. By increasing the facilities available to users and emphasizing low stress bikeways and connectivity to destinations, mode share is anticipated to increase. While specific increases in mode share depend on many factors, usage may increase to levels seen cities with comparable characteristics and thus looking at the walk and bike mode share of other cities provides a reasonable comparison.

Sacramento is a city in the Central Valley with a comparable climate to that of the Merced County region. Sacramento currently has a 3.0% walking mode share and a 1.5% bicycling mode share. Though no single city is exactly comparable, this comparison provides a reasonable targets to achieve by implementing the ATP. Achieving comparable mode shares in Merced County jurisdictions would result in significant increases in the number of walk and bike trips, as displayed in **Table 10**. As discussed in **Chapter 2**, these numbers are based on commute trips and do not include shopping, school, or recreational trips, or commuters who only walk or bike to work part time. Thus, the actual number of future trips is likely to be higher than these estimates.

By implementing this plan, it is also anticipated that collisions involving bicyclists and pedestrians may be reduced. A target for the reduction of injuries and fatalities in roadway users is being established as part of the MCAG Comprehensive Safety Action Plan (2024), which will build upon the countermeasures and projects recommended in this plan. In addition to these direct health improvements due to collision reduction, implementation will also improve health outcomes associated with increased physical activity by region residents, such as reduced incidence of heart disease, high blood pressure, Type 2 diabetes, and obesity.

Table 10
Means of Transportation to Work (2022 5-Year Average)

Location	Walking				Bicycling			
	Current		Goal		Current		Goal	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Merced County (As A Whole)	2,481	2.3%	4,255	4%	396	0.4%	1,596	1.5%
Merced County (Unincorporated)	446	2.2%	821	4%	0	0%	308	1.5%
Merced County (Cities)	1,028	1.4%	2,163	3%	391	0.5%	1,082	2%

Source: US Census Bureau American Community Survey (ACS) 2018-2022 5-Year data.
Workers aged 16 years and older, excludes percentage of employees that work from home.

Measures of Effectiveness and Tracking Progress

This plan establishes a framework for improving active transportation across the region. However, monitoring of progress must occur to understand whether the goals of this plan are being achieved and those who walk, bike, and roll feel safe and comfortable using the active transportation network. This requires ongoing collaboration, with roles for local jurisdictions, MCAG, and the community.

As the regional transportation planning agency, MCAG serves in a number of transportation planning roles in Merced County based on local, state, and federal designations. These designations offer increased funding and responsibility for MCAG in transportation planning, including oversight of several programs that can contribute to the expansion and safety of active transportation networks throughout the region. Without a dedicated funding source, project implementation will typically rely on federal or state funding or capital improvement funding that can include roadway safety enhancements. MCAG will continue to serve as the convenor for local agencies, and play a role in regional facilitation, including support for priority projects identified in this ATP.

Communities in which members of the public, elected officials, and agency staff are all on the same page of understanding trade-offs to operations and safety see the most success. Local jurisdictions have a critical role to play in building out the region's active transportation network, shifting more trips to active modes, and reducing traffic collisions that kill or seriously injure people. Cities and the County own, operate, and maintain the streets and roadways within the region, except those owned by Caltrans, and will ultimately prioritize, fund, build, and permit the construction of most non-freeway roadway projects in the region. Dedicated staff time is critical to coordination of improvements, relaying project benefits to agency staff, elected officials, and public, and keeping a project moving forward. This also includes maintaining policy and design standards that align with industry best practices.

A sample framework for implementation has been provided on the following pages. This framework aligns with the guiding principles of the ATP, and includes suggested practices and recommendations that jurisdictions may choose to adopt or pursue to reduce barriers to implementation, and track progress over time. Both individual and collaborative actions by jurisdictions will aid in meeting the responsibility agencies have for implementing projects in a way that is fiscally responsible and yields the greatest benefit to the health, mobility, and livelihoods of the residents and communities of Merced County.

1 Safety

Create and maintain a safe environment for people walking, biking, and rolling

Traffic-related and personal safety issues are a barrier for people bicycling and walking. Increase opportunities for people of all ages and abilities to easily access local streets and pathways and reduce the number, rate, and severity of collisions involving people walking, biking, and rolling.

Objective 1.1
Reduce pedestrian and bicyclist related collisions.

Baseline Data
Existing bicycle/pedestrian.

Recommended Strategies
- Adopt a Vision Zero commitment and action plan, which identifies strategies to eliminate all traffic fatalities and severe injuries, consistent with in-progress Comprehensive Safety Action Plan (MCAG) and Local Road Safety Plan (County).
- Develop an annual review process for bicycle and pedestrian crash data (including causes) to implement ongoing infrastructure improvements throughout the transportation system.
- Install safety enhancements to improve conditions for the most vulnerable road users, such as people using mobility devices youth, and older people.
- Prioritize safety improvements, such as high visibility crosswalks, at intersections and corridors with high numbers of bicycle and pedestrian crashes.

Objective 1.2
Reduce traffic stress for non-motorized roadway users (as measured by Level of Traffic Stress or LTS).

Baseline Data
- Percentage of roadways at the highest levels of LTS 3 and 4 (least comfortable) vs those at lowest levels of LTS 1 and 2 (most comfortable).
- Percentage of residents living within ¼-mile of low-stress facilities (LTS 1 or 2).

Recommended Strategies
- Provide more physically separated active transportation facilities, such as class I bikeway shared-use paths, class IV separated bikeways, and sidewalks.
- Provide alternative facilities on lower-stress neighborhood streets, such as well-connected bicycle boulevards.
- Design existing roads to accommodate active transportation modes.

Objective 1.3
Follow best practices in transportation facility planning and design.

Recommended Strategies

- Update public works documents that guide facility development (for example, Improvement Standards and Specifications) every 10 years to reflect current Caltrans, Manual on Uniform Traffic Control Devices (MUTCD), and best practice guidance, such as guidelines from the National Association of City Transportation Officials (NACTO).
- Adopt a Complete Streets ordinance and corresponding cross-sections for different street typologies to guide construction of new streets and retrofitting of existing streets.
- Provide wider class I bikeway shared-use paths (approximately 12' or more where possible) in areas of high activity.
- Consider the addition and/or improvement of bikeways, where feasible, when improving existing roads.

Objective 1.4
Make travel to school via active modes safe, comfortable, and convenient for students and families.

Baseline Data
Mode split for students traveling to schools via tallies and/or surveys.

Recommended Strategies

- Coordinate with agencies such as The Bus and Merced County Public Health to implement a comprehensive Safe Routes to School educational program.
- Prioritize active transportation improvements in close proximity to schools throughout Merced County.

2 Mode Shift

Increase the percent of trips made using active modes throughout the region

Creating walkable and bikeable communities can reduce greenhouse gas (GHG) emissions by encouraging people to use active transportation rather than drive, particularly for short trips. Integrating the implementation of separated and low stress facilities into development and land use processes can make communities more resilient in the face of climate change impacts.

Objective 2.1
Align local implementation of regional Sustainable Communities Strategies by tracking transportation-related greenhouse gas emissions at the County level, and conduct cost/benefit analyses of transportation projects using GHG emissions as a criterion.

Baseline Data
Framework and methodology for tracking Greenhouse Gas emissions related to transportation.

Recommended Strategies
- Make a public commitment to reducing GHG emissions.
- Rely upon GHG emission reduction calculations as a metric for guiding investment decisions.
- Modify cost/benefit analyses to incorporate and consider the GHG emission impact of transportation investments.

Objective 2.2
Reduce overall Vehicle Miles Traveled (VMT).

Baseline Data
- Number of Vehicle Miles Traveled per capita.
- ACS Mode share.

Recommended Strategies
- Complete VMT-based traffic impact analysis in compliance with SB743 on residential and office land use projects, when applicable.
- Support compact growth and integrated transportation/land use planning.
- Encourage large-scale trip generators, including County and City facilities, to create and implement Transportation Demand Management programs that emphasize the importance of walking to employees and visitors.
- Ensure all facilities where public employees work enforce the State's parking cash-out law that requires employers who provide subsidized parking for their employees to also offer a cash allowance in lieu of a parking space.
- Encourage the use of DIBS Rideshare Program, including carpooling, vanpooling, and public transportatio

Objective 2.3
Develop shared-use facilities along canals and off-road easements.

Baseline Data
Linear miles of canals or levees with maintenance roads viable for shared-use facilities.

Recommended Strategies
When upgrading or enhancing irrigation, levee, and flood control facilities throughout the region, look for opportunities to implement shared-use pathways as feasible in conjunction with maintenance/access needs.

Objective 2.4
Set a goal to increase active mode share of all trips.

Baseline Data
Percentage of active transportation mode share of trips.

Recommended Strategies
- Promote active travel as a viable transportation option.
- Implement proposed active transportation infrastructure improvements via local CIPs to create a better-connected network.

3 Equity

Prioritize active transportation investments in underserved communities

Bicycle and pedestrian facilities provide affordable, healthy transportation solutions, regardless of ethnicity, age, or income. However, access to transportation options may not be equal across all communities. This Plan increases opportunities for the active transportation network to address current and historic inequities and improves economic opportunities for residents.

Objective 3.1
Improve opportunities for residents to engage in active transportation.

Baseline Data
- Healthy Places Index.
- Number of existing programs serving residents.

Recommended Strategies
- Promote existing active transportation facilities through community events and programs, signage, and education campaigns.
- Provide educational materials on the benefits of physical activity.
- Implement proposed active transportation improvements throughout disadvantaged and disconnected communities and neighborhoods.

Objective 3.2
Address current and historical inequities in the provision of active transportation infrastructure.

Baseline Data
- Rates of poverty.
- Median household income.
- Employment statistics from the most recent 5 years.
- Mileage of low-stress bikeways in low-income neighborhoods.

Recommended Strategies
Prioritize the implementation of planned projects identified in this Active Transportation Plan based on historical lack of investment and current need.

Objective 3.3
Make the transportation planning and implementation process more transparent and open to all community members.

Baseline Data

- Number of events and programs related to active transportation.
- Number of participants in events and programs related to active transportation

Recommended Strategies

- Develop outreach materials with context and in languages that are community-specific; host community meetings at locations that are convenient with respect to time and location as well as accessible by multiple forms of transportation.
- Host engagement events in areas that attract significant numbers of people, such as community events and gatherings
- Ensure information on how to request public services is available online, in multiple languages for access by non-English proficient residents, and that the website is ADA compliant.
- Develop multilingual education campaigns to communicate the rights and responsibilities of all roadway users.
- Develop environmental justice components in a collaborative fashion with local groups and stakeholders.

4 Connectivity

Create a pedestrian and bicycle network that connects people to key destinations and public transit

Implementing bicycle and pedestrian infrastructure allows residents to access local and regional destinations safely and comfortably on bicycle or by foot.

Objective 4.1
Develop a robust and well-connected active transportation network to provide regional and local connections throughout communities.

Baseline Data
- Number of miles of existing Class I bikeway shared-use paths and other active transportation facilities within and between communities.
- Number of marked pedestrian crossing opportunities.

Recommended Strategies
- Utilize existing maintenance roads on irrigation canals for building shared-use paths.
- Identify and track the number of existing and new marked pedestrian crossing locations.
- Identify and develop Mobility Hubs; provide adequate active transportation facilities and wayfinding to connect to Mobility Hubs.

Objective 4.2
Provide low-stress access to key destinations such as employment destinations, grocery stores, transit stops, parks, libraries, and other community destinations.

Baseline Data
Number of key destinations that are within ¼ mile of the low-stress active transportation network.

Recommended Strategies
Prioritize the implementation of pedestrian and bicycle infrastructure that connects to schools, parks, healthcare, community services, employment centers, grocery stores, and other key destinations.

Objective 4.3
Develop a comprehensive facility identification and wayfinding program.

Baseline Data
Existing network of directional signage directed towards active transportation users.

Recommended Strategies
- Inventory existing signage and implement wayfinding program.
- Develop branding and deploy wayfinding signage to major destinations and between transportation facilities.

Objective 4.4
Provide adequate end-of-trip facilities for active transportation users.

Baseline Data
- Number of short-term bike parking facilities (for example, bicycle racks and corrals).
- Number of long-term bike parking facilities (for example, bicycle lockers and storage rooms).

Recommended Strategies
- Install secure, long-term bicycle parking and storage at major transit hubs.
- Encourage bike parking facilities in new developments and redevelopment projects beyond those in the California Building Code (CBC) and other applicable standards and guidelines; provide assessment-based incentives, where feasible, on a case-by-case basis.
- Conduct a baseline inventory of end-of-trip facilities in each community.

Objective 4.5
Allow for modes of active transportation and electric-powered micromobility to expand options for residents and visitors.

Baseline Data
Percentage of county population using active transportation and other travel modes to include emerging trends such as scooters, e-bikes, neighborhood electric vehicles (NEVs), and other non-human powered micro mobility options.

Recommended Strategies
Incorporate design flexibility into public spaces, including bus stops and transit hubs, to allow for new mobility devices in the future.

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