CITY OF
MODESTO
CALIFORNIA

Non-Motorized Transportation Plan

FINAL - AUGUST 2024

ACKNOWLEDGMENTS

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CHAPTER 1

Executive Summary

Goals

This 2023 update to Modesto's Non-Motorized Transportation Plan is the guiding document for city staff, officials, developers, and residents to create a safe, balanced, and comfortable transportation system for all roadway users, especially people walking, biking, and rolling. This Plan aims to promote and support walking, biking, and rolling through the development of safe, comfortable, and connected bicycle and pedestrian networks and the implementation of supportive policies and programs. This Plan seeks to:

- Build connected bicycle and pedestrian networks that link residents to neighborhood destinations (such as schools, parks, libraries, and grocery stores) and citywide destinations (like public transit stations, shopping centers, and major employers).
- Prioritize and implement safety improvements throughout Modesto that reduce and minimize collision and injury risks to people driving, walking, biking, or rolling.
- Create bicycle and pedestrian networks that are accessible and comfortable for people of all ages and abilities.
- Develop and maintain programs that provide educational tools and encouragement resources that support and help grow walking and biking as reasonable, practical means of transportation.
- Incorporate high-quality design features, construction mitigation efforts, and practical, efficient maintenance standards that improve the quality of life of all residents.
- Develop a list of prioritized, practical, and publicly supported infrastructure projects and programs that can be funded through many potential funding streams, including grants, repaving programs, and coordinating with other development projects or partner agencies.

Connectivity

Safety

Accessibility

Education and Encouragement

Quality of Life

Funding and Implementation

This Plan also provides an implementation strategy to build out the pedestrian and bicycle networks through prioritization and phasing. This process strives to create a fundable and implementable list of projects. Investing in the enhancement of citywide bicycle and pedestrian networks creates lasting impacts on residents and their communities. A safe, comfortable, and inviting built environment that supports active transportation can:

- Increase the livability of and quality of life in Modesto.
- Increase recreational opportunities through improved access to outdoor facilities and amenities.
- Decrease the risk of bicycle- and pedestrian-involved collisions and injuries.
- Provide affordable transportation options for low-income and disadvantaged residents.
- Improve air quality through the reduction of vehicle emissions.

Modesto is well-positioned to prioritize building infrastructure designed for people of all types, ages, and abilities to walk and bicycle comfortably to schools, parks, transit, and other local and regional destinations.

There are many potential, proposed, and planned projects that will continue to shift and transform Modesto's local and regional transportation environment. As both infrastructure and travel patterns change from new developments and changing office environments, there is potential to build infrastructure more supportive of neighborhood trips. The recommendations proposed in this Plan lay the foundation that will help build a more connected, accessible, healthy, and safe Modesto.

Recommendations

This 2023 update to the Non-Motorized Transportation Plan was developed with a robust community engagement process. During the Plan's development, hundreds of comments were received from Modesto stakeholders. Community engagement combined with the existing conditions analysis led to the development of 109 pedestrian spot improvement recommendations and over 192 miles of recommended bicycle facilities. Recommended bicycle projects, broken down by bicycle class are shown in Table 1. The Plan also provides policy and program recommendations. Details on project recommendations are located in Chapter 5.

Table 1: Bicycle Facility Network by Bikeway Classification (Miles)

	Existing Bikeways	Facilities Being Upgraded	Recommended Facilities	Full Network Build-Out
Shared-use Path	17.1	0.0	26.1	43.2
Bicycle Lane	26.0	18.8	11.2	18.4
Buffered Bicycle Lane	17.3	13.0	6.4	10.6
Bicycle Route	39.8	26.5	0.3	13.6
Bicycle Boulevard	0.0	0.0	94.9	94.9
Separated Bikeway	4.4	0.0	53.3	57.7
Total	**104.6**	**58.3**	**192.2**	**238.4**

NEXT STEPS

Infrastructure projects are prioritized for design and construction based on the following factors:

- Safety
- Connectivity
- Accessibility
- Equity
- Feasibility

Projects are then grouped into four implementation categories based on their prioritization score:

SHORT-TERM PROJECTS

- Bicycle projects: 30 projects
- Pedestrian projects: 12 projects

MEDIUM-TERM PROJECTS

- Bicycle projects: 18 projects
- Pedestrian projects: 66 projects

OPPORTUNITY PROJECTS

- Bicycle projects: 49 projects
- Pedestrian projects: 14 projects

LONG-TERM PROJECTS

- Bicycle projects: 14 projects
- Pedestrian projects: 17 projects

In addition to those four prioritization buckets, the highest-ranked short-term projects are considered First Phase projects. These are projects that have that the highest community benefits with high project feasibility. First Phase projects should be pursued first by Modesto staff. The prioritization process and complete project rankings are provided in Chapter 6. Figure 1 shows the First Phase bicycle projects and pedestrian projects. Table 2 shows the First Phase bicycle projects and Table 3 shows the First Phase pedestrian projects. The full list of prioritized projects can be seen in Tables 9 and 10.

Table 2: First Phase Bicycle Projects

	Street	To Street	From Street	Bike Class	Miles	Points	Category
Bike Projects	H St	1st St	Downey Ave	Class IV	1.34	10.5	Short-Term
	Crows Landing Rd	City Limit	E Hatch Rd	Class IV	0.85	9.5	Short-Term
	El Vista Ave	Yosemite Blvd	Oakdale Rd	Class IV	0.98	9.5	Short-Term
	Parker Rd	Claus Rd, E Briggsmore Ave	East city limit	Class IV	0.98	9.5	Short-Term
	La Loma/ Encina/ Miller Bike Boulevard Group	La Loma Ave	Encina Ave, N Santa Rosa Ave	Class IIIB	8.50	9.0	Short-Term
	Sutter/ Emerald Bike Boulevard Group	Kirschen Dr	Yellow Pine Dr	Class IIIB	5.09	9.0	Short-Term
	W Orangeburg Ave	Carver Rd	Evergreen Ave	Class II	0.59	9.0	Short-Term
	Claus Rd	Yosemite Blvd	Creekwood Dr	Class IV	0.84	8.5	Short-Term
	Paradise Ave	Beverly Dr, Harris Ave, Wade Ave	South city limit	Class IV	0.45	8.5	Short-Term
	Floyd/ Sunrise Bike Boulevard Group	W Orangeburg Ave	W Granger Ave	Class IIIB	11.02	8.0	Short-Term
	Carver Bike Boulevard Group	McHenry Ave	Tully Rd	Class IIIB	8.68	8.0	Short-Term
	I St	Washington St	17th St	Class I	1.13	8.0	Medium-Term
	Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class I	0.89	6.5	Short-Term
	Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class IV	0.77	6.5	Short-Term
	Scenic Dr (EB)	McGuire Dr	Lakewood Ave	Class II	0.75	6.0	Short-Term
	Lakewood Ave	Briggsmore Ave	Scenic Dr	Class IV	0.81	4.5	Medium-Term
	Lakewood Ave	Briggsmore Ave	Scenic Dr	Class I	0.81	4.0	Medium-Term
	Lakewood-Lincoln Ave Trail Bridge	Scenic Dr	Dry Creek Trail Connector/ Bridge	Class I	0.19	4.0	Medium-Term

Table 3: First Phase Pedestrian Projects

	ID	Cross Street 1	Cross Street 2	Recommendation	Points	Category	FirstPhase
Pedestrian Projects	13	Santa Barbara Ave	La Loma Ave	Install high-visibility crosswalks with advanced stop bars across both crossing at Santa Barbara Avenue and restripe the high-visibility crosswalk across La Loma Ave with advanced yield markings. Install an RRFB for the La Loma crossing.	9	Short Term	Yes
	18	Crows Landing Rd	School Ave	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes
	19	Crows Landing Rd	E Hatch Rd	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes
	24	Paradise Rd	Pine Tree Ln	Refresh the high-visibility crosswalk across Paradise Road with advance yield markings. Install a pedestrian hybrid beacon for this crossing.	8.5	Short Term	Yes

	ID	Cross Street 1	Cross Street 2	Recommendation	Points	Category	FirstPhase
Pedestrian Projects	44	Lucern Ave	Coffee Rd	Upgrade all crosswalks to high-visibility crosswalks and install advanced stop marking, and leading pedestrian intervals for all crossing phases. Study free-right turn lane removal on the southeast corner.	8.5	Short Term	Yes
	64	W Rumble Rd	Tully Rd	Upgrade the existing eastern and western crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes
	74	Carver Rd	Orangeburg Ave	Upgrade all crosswalks to high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases.	8	Short Term	Yes
	39	E Briggsmore Ave	Coffee Rd	Short term: Upgrade all crosswalks to high-visibility. Long Term: Conduct traffic study to consider removing both free-right turn lanes and other intersection design/geometry improvements.	7.5	Short Term	Yes

	ID	Cross Street 1	Cross Street 2	Recommendation	Points	Category	FirstPhase
Pedestrian Projects	45	Scenic Dr	Coffee Rd	Upgrade all existing crosswalks to high-visibility and install leading pedestrian intervals for all crossing phases. Study free-right turn lane removal.	7.5	Short Term	Yes
	67	W Granger Ave	Tully Rd	Construct curb extensions at the two eastern corners and provide a leading pedestrian interval for all crossing phases.	7.5	Short Term	Yes
	97	H St	7th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	7.5	Short Term	Yes
	108	10th St	Morton Blvd	In coordination with other pedestrian improvements between B Street and Morton Boulevard, install a high-visibility crosswalk with RRFB for a crossing of Morton Boulevard.	7.5	Short Term	Yes

FIRST PHASE PROJECTS

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Pedestrian Recommendations

- First Phase Ped Projects
- First Phase Bicycle Projects

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

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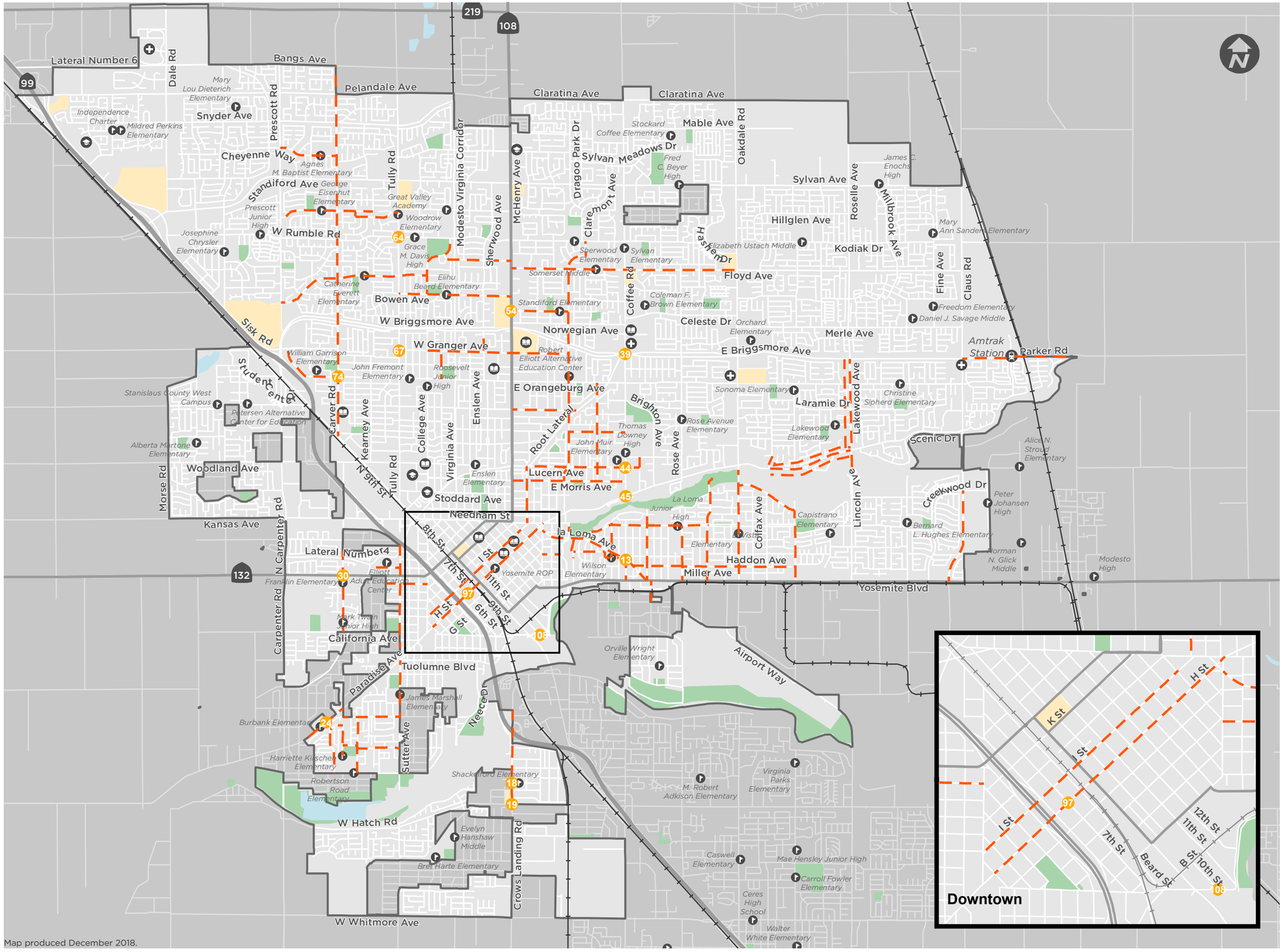

Figure 1: Top Prioritized Projects

CHAPTER 2

Introduction, Vision, Goals, & Policies

INTRODUCTION

The 2023 Update to the Non-Motorized Transportation Plan works toward building a balanced transportation system that is safe, comfortable, and accessible for people walking, biking, and rolling on wheelchairs, skateboards, and scooters. The Plan lays out a strategy to develop comprehensive bicycling and walking networks that provide access to transit, schools, parks, trails, and downtown. The Plan also includes information on support and end-of-trip facilities like bicycle parking, benches, and other amenities. These infrastructure improvements are paired with programs to educate, encourage, and support walking, rolling, and bicycling. Project and program recommendations were developed based on a thorough needs analysis and community engagement process.

This document provides a plan to design and construct new infrastructure recommendations through prioritization and phasing to ensure implementation is manageable and fundable. This Plan represents a long-term vision for walking, rolling, and biking in Modesto, recognizing that funding and resources will require phased implementation over time.

VISION STATEMENT

The City of Modesto envisions creating a comprehensive network of bicycle and pedestrian infrastructure, amenities, and programs that foster safe and comfortable walking, rolling, and biking trips to schools, jobs, and community destinations. Supporting walking and bicycling provides residents with healthy, low-cost transportation options for people of all ages and abilities for many trip purposes.

GOALS

Connectivity

Build connected bicycle and pedestrian networks that link residents to local destinations (schools, parks, libraries, grocery stores, etc.) and citywide destinations (public transit, shopping centers, employment centers, etc.).

Safety

Prioritize and implement safety improvements throughout Modesto that reduce modal conflicts and minimize collision and injury risks.

Accessibility

Create bicycle and pedestrian networks that are accessible and comfortable for people of all ages and abilities.

Education and Encouragement

Develop and maintain programs that provide educational tools and encouragement resources that support and help grow walking and biking as reasonable, practical means of transportation.

Quality of Life

Incorporate high-quality design features, construction mitigation efforts, and practical, efficient maintenance standards that work toward improving the quality of life of all residents.

Funding and Implementation

Develop a list of prioritized, practical, and publicly supported infrastructure projects and programs that can be funded through many potential funding streams, including grants, repaving programs, and coordinating with other development projects or partner agencies.

POLICY RECOMMENDATIONS

PLANNING POLICIES

Policy 1: Integrate bicycle and pedestrian network and facility needs into all City planning documents and capital improvement projects.

Actions:

- **1.1:** Review the City's Capital Improvement Program (CIP) list annually to ensure that recommended projects from this Plan are incorporated for new facilities and the maintenance of existing facilities.
- **1.2:** Follow a multi-disciplinary project scoping process that incorporates the needs of all modes and stakeholders, both internal and external. The design process should include the City divisions, departments, and staff responsible for emergency response, parking, law enforcement, maintenance, and other affected areas.
- **1.3:** Evaluate all streets during pavement resurfacing to determine if bicycle facilities can be provided when the striping is reapplied.
- **1.4:** Conduct regular pedestrian and bicycle counts according to regional methodology before and after project implementation.
- **1.5:** Ensure that all traffic impact studies, analyses of proposed street changes, and development projects address impacts on bicycling and walking facilities.

Policy 2: Coordinate with other agencies and stakeholders to incorporate and implement Plan policies and recommendations.

Actions:

- **2.1:** Work with adjacent government entities, public service companies, partner agencies, transit agencies, and school districts to ensure that Plan recommendations are incorporated into their planning and areas of responsibility, and vice versa.
- **2.2:** Work with transit providers to improve bicycle and pedestrian access to transit stations/stops and improve the comfort of amenities at stops/stations (including providing secure bicycle parking, covered waiting areas, benches, etc.).

DESIGN POLICIES

Policy 3: Design a low-stress bikeway network to serve people of all ages and abilities.

Actions:

- **3.1:** Design a network of continuous low-stress bikeways as identified in this Plan.
- **3.2:** Utilize North American City Transportation Officials and the most recent State and Federal design standards and guidelines to develop plans for on-street bicycle facilities along corridors and at intersections.
- **3.3:** Follow a multi-disciplinary design process that incorporates and balances the needs of all modes and stakeholders, both internal and external; the design process should include the City divisions, departments, and staff responsible for emergency response, parking, law enforcement, maintenance, and other affected areas.

Policy 4: Design a connected, convenient, and comfortable pedestrian network to serve people of all ages and abilities.

Actions:

- **4.1:** Include sidewalks on all new or retrofitted roadways.
- **4.2:** Identify and construct sidewalks in areas where they are incomplete.
- **4.3:** Install leading pedestrian interval phases in traffic signal timing, as warranted, to encourage walking and facilitate crossing busy streets with high volumes of turning movements.
- **4.4:** Review signal locations on an annual basis to identify and adjust for increased pedestrian clearance time where needed.
- **4.5:** Routinely evaluate locations for enhancing crosswalks.
- **4.6:** Plan and develop well-connected streets, sidewalks, and pathways that provide the most direct paths of travel for pedestrians. Provide connections between or through cul-de-sacs and remove barriers to walking where feasible.

Policy 5: Develop an easy-to-read, unified, and comprehensive wayfinding system for people walking and biking.

Actions:

- **5.1:** Develop a consistent citywide wayfinding program focused on signage for active transportation users.

PROJECT FUNDING & IMPLEMENTATION POLICIES

Policy 6: Leverage existing funding to maximize project delivery.

Actions:

- **6.1:** Utilizing available funds as a local match, aggressively pursue funding from available grant sources. A list of possible funding opportunities is presented in Appendix A.
- **6.2:** Actively develop projects from this Plan to position Modesto to compete for grant funding.
- **6.3:** Seek to submit grant applications for projects that most competitively match with funding agency criteria.
- **6.4:** Use the Plan's project prioritization list as a guide when determining which projects to proceed with next.

Policy 7: Continue and expand Modesto's annual allocation of bicycle and pedestrian projects and program implementation funds.

Actions:

- **7.1:** Through the CIP process, assess, and prepare for upcoming staffing, consultant, and capital funding needs as projects arise.
- **7.2:** Allocate funds to maintain and support walking, biking, accessibility, safe routes to schools, and safe routes to transit programs.

Policy 8: Construct projects from this Plan utilizing all available internal and external resources.

Actions:

- **8.1:** If additional internal support is required, establish a full-time pedestrian and bicycle coordinator position and/or a safe routes to school coordinator position to assist with planning and implementing bicycle and pedestrian projects and programs.
- **8.2:** Consistent with the policies and procedures of the Modesto City Council, create a Citizen Advisory Group to research, study, and discuss bicycle, pedestrian, safe routes to schools, and safe routes to transit issues. This group should continue and supplement the City's coordination with Stanislaus Council of Governments' (StanCOG's) Bicycle and Pedestrian Advisory Committee (BPAC). The Citizen Advisory Group's membership should be constructed with the following principles in mind:
  - Equitable representation: Members should represent all geographic areas of the City. Membership should accurately reflect the ethnic and socioeconomic makeup of Modesto as much as possible. Membership should also represent each mode, having members who actively walk, bike, and use mobility devices around the City.
  - Equitable outreach: The Advisory Group should make extra efforts to reach out to all segments of Modesto's population, conducting engagement in multiple languages through different mediums whenever possible.
  - The Advisory Group should be consulted for feedback on planning projects, development projects, policies, climate change, and other issues that relate to transportation.

Policy 9: Ensure that bicyclists and pedestrians have accommodation in construction zones.

Actions:

- **9.1:** Incorporate routine accommodation for pedestrian and bicycle facilities when roadway or other construction work disrupts typical uses of sidewalks, trails, and on-street bicycle facilities.

MAINTENANCE POLICIES

Policy 10: Maintain designated facilities to be comfortable and free of hazards to people walking and bicycling.

Actions:

- **10.1:** Sweep streets regularly, with priority given to those with higher pedestrian and bicycle traffic.
- **10.2:** Trim overhanging and encroaching vegetation to maintain a clear travel path along pedestrian and bicycle facilities.
- **10.3:** Develop and implement an appropriate minimum paving surface standard for bicycle boulevards and other low-stress bikeways.
- **10.4:** Update repaving project selection methodology to prioritize bicycle boulevards and other low-stress bikeways to ensure that the minimum paving surface standard is maintained.
- **10.5:** Incorporate maintenance needs into the design of separated bikeways and trails to ensure proper maintenance after construction.

PROGRAM POLICIES

Policy 11: Educate people walking, bicycling, and driving, and the general public about roadway safety and the benefits of bicycling and walking.

Actions:

- **11.1:** Work with local partners (bike shops, bicycle/walking groups, and advocacy/ non-profit organizations) to coordinate and support bicycle and pedestrian educational programs and campaigns.

Policy 12: Coordinate and collaborate with all local school districts to create a citywide Safe Routes to School Program. Encourage Modesto public schools to participate in the Safe Routes to School Program.

Actions:

- **12.1:** Support school travel safety assessments at Modesto public schools and utilize improvement plans to pursue grant funding for implementation.
- **12.2:** Participate and support Safe Routes to School meetings and other encouragement events/activities.

Policy 13: Increase bicycling and walking through targeted marketing and promotion.

Actions:

- **13.1:** Provide current and easily accessible information about the Modesto bicycle network, bicycle programs, and bicycle parking. This includes distributing online and print bicycle maps, maintaining up-to-date City web pages, and providing ongoing public engagement opportunities.
- **13.2:** Encourage major employers to continue, develop, or expand bicycle promotion programs for their employees. Recognize companies designated as a Bicycle Friendly Business by the League of American Bicyclists
- **13.3:** Encourage the use of bicycles for City employee commute and work travel purposes to see the City as a model employer.
- **13.4:** Continue to sponsor Bicycle to Work Day in May to receive input on the pedestrian and bicycle program and educate the public about the benefits of walking and bicycling.
- **13.5:** Work with major employers to set up and maintain Transportation Demand Management programs.

EVALUATION POLICIES

Policy 14: Measure bicycling and walking activity through an annual count program.

Actions:

- **14.1:** Establish an annual count program at critical locations around the city. Ensure methodology is consistent with other metrics collected locally and regionally.
- **14. 2:** Make the data publicly available on an ongoing or at least annual basis.

Policy 15: Report annually on the implementation of this Plan.

Actions:

- **15.1:** Prepare and present a report to the StanCOG BPAC, Citizens Advisory Group (if created), and City Council.

BENEFITS OF WALKING AND BIKING

Public Health

Walking, bicycling, and other forms of active transportation (rolling, scooting, etc.) provide many benefits to individuals and communities. Active transportation is closely linked to health outcomes. The Stanislaus County Community Health Assessment 2020 (CHA 2020) discusses multiple health, safety, and "thriving" factors that impact individual and overall community health. All three of these areas have connections to active transportation. The report stated the lack of physical activity is one of the four leading risk factors for chronic disease. The leading cause of death within Stanislaus County is heart disease; obesity and physical inactivity are among the risk factors for heart disease.

Further, obesity rates within the County have risen by 45% between 2012 and 2017. Asthma is also a public health issue; Stanislaus County has a higher rate of emergency room visits for Asthma-related problems than the state average. Many factors can contribute to asthma, including air pollutants and overall air quality.

Roadway safety also contributes to health outcomes. While the CHA 2020 focuses on deaths related to vehicle collisions, pedestrian- and bicycle-involved collisions also impact health outcomes. The Needs Analysis in Chapter 3 will detail the locations of pedestrian- and bicycle-involved collisions throughout Modesto.

Transportation is one of the four "thriving" factors that also affect health outcomes. The availability of reliable, safe transportation is critical for residents to access jobs, healthcare, schools, food, and many other destinations and services. Besides providing safe, low-stress facilities for people walking and biking, improving access to transit stops and stations is also essential to promoting active and shared transportation modes.

Walking and bicycling can increase physical fitness and health, create low- or no-cost transportation options, provide access to community-serving destinations like parks, schools, health care, and shopping, using an environmentally-friendly transportation option.

Economics

Active transportation can also provide economic benefits to communities. Increasing walking and bicycling can reduce congestion and parking costs, increase individual mobility, create vibrant and welcoming streetscapes, and improve local businesses' accessibility and visibility.[1] The walking and bicycling environment must be designed to create safe, comfortable, and inviting places to walk and bike around Modesto to foster additional active trips. This Plan's goals and outcomes lay the foundation for Modesto to make infrastructure, policy, and program decisions that build and support active transportation.

1 Cullen McCormick, "York Blvd: The Economics of a Road Diet," (2012)

Walking and bicycling can ***increase physical fitness and health*** *using an environmentally-friendly transportation option.*

CHAPTER 3

Existing Conditions & Needs Analysis

Transportation Plan Review

This Non-Motorized Transportation Plan seeks to build on prior planning efforts to create a comprehensive and cohesive vision for walking, biking, and rolling in Modesto. The following documents were reviewed:

- *Modesto Urban Area General Plan*
- *Modesto Redevelopment Master Plan*
- *Non-Motorized Transportation Plan (2006)*
- *Complete Streets Safety Assessment*
- Airport Neighborhood Safe Routes to School Action Plan
- Stanislaus County General Plan
- StanCOG Non-Motorized Transportation Plan

Additional references, including corridor studies, future transportation projects, specific plans, and other relevant documents, were also reviewed.

EXISTING CONDITIONS

Community and Geographic Context

Modesto, located in north-central Stanislaus County, has over 215,000 residents (US Census, American Community Survey 2019). Modesto's arterial and collector streets form a grid network that connects most areas of the city. However, many residential streets deviate from the grid and follow a more suburban development pattern. Modesto is a relatively flat city with a temperate climate, increasing the attractiveness of walking, rolling, and biking.

As a large, expansive city, Modesto has both neighborhood-serving destinations like parks and schools in addition to citywide and regional destinations including Modesto Junior College, retail areas, and employment centers. Many neighborhood-serving destinations are located within or near residential areas, making these relatively short trips good candidates for active transportation instead of driving. Citywide and regional serving destinations likely require travel on or across an arterial or collector road. Infrastructure limitations and barriers can negatively affect an individual's propensity to walk or bike. High-volume roadways, high-speed roadways, railroad tracks, highways, and similar barriers create uncomfortable and stressful walking and bicycling conditions.

NEEDS ANALYSIS

The following sections will briefly summarize the Needs Analysis's six components: demand, connectivity, comfort, safety, accessibility, and barriers.

Demand

In terms of commute travel demand, about one-third of Modesto residents live and work within the City. Ceres and Turlock are the following two most popular cities for Modesto residents to commute into and for those residents to commute into Modesto. Table 4 displays the top 10 cities residents commute out to, and cities workers commute in from, 2018 data. Private automobiles are the primary means of transportation for most Modesto workers. About 95% of work trips are completed by car; 85% of trips are done by people driving alone. Public transit and bicycling account for under 1% each of work trips. Just over 1% of commuters walk to work and 3% work from home (American Community Survey, 2019).

Table 4: Commute Origins and Destinations - 2018 Data (US Census)

Top 10 Commute Destinations for Residents (% of residents)		Top 10 Origin Cities for Modesto Workers (% of workers)	
Modesto	34%	Modesto	32%
Turlock	5%	Ceres	4%
Ceres	5%	Stockton	3%
Riverbank	3%	Turlock	3%
Manteca	2%	San Jose	2%
Stockton	2%	Tracy	2%
Oakdale	2%	Salida	2%
Salida	2%	Manteca	2%
San Jose	1%	San Francisco	1%
Tracy	1%	Sacramento	1%

COVID-19 has shifted travel patterns and the necessity of office work for some professions. These shifts may have medium- to long-term effects on commute-related transportation.

Residents walk and bike to many destinations across the City. Many of these destinations are neighborhood-serving, including schools, parks, libraries, local stores, and workplaces. Figure 2 shows many of the major destinations across Modesto.

MAJOR DESTINATIONS

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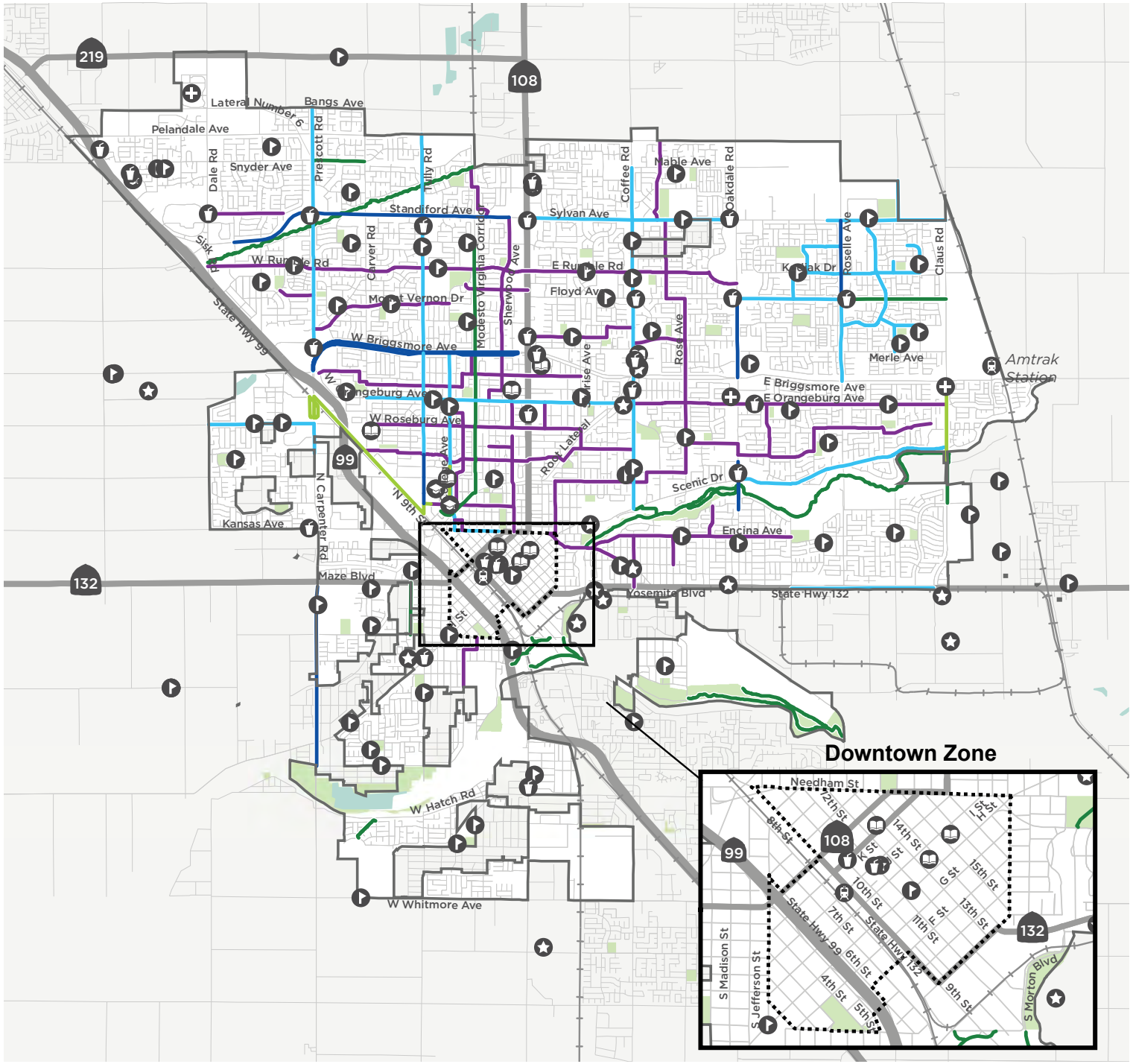
Destinations + Boundaries

- Transit Hub
- Shopping Center
- School
- Major Employer
- College
- Hospital
- Library
- Downtown Zone
- City Boundary
- Park

Existing Bikeways

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bicycle Route
- Class IV Separated Bikeway



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Map produced March 2019.

Figure 2: Major Destinations

SCHOOLS

Within Modesto, there are 68 public schools across five school districts. While schools are reasonably distributed across the city, individual school enrollment boundaries, where present, can create unequal travel distances for each school's families. The further a family lives away from their school campus, the less likely they are to choose an active mode to get there. Schools are not always centered within these enrollment areas, making inequitable travel distances for the student body. Despite that, walking and biking can still be practical for many families in terms of travel distance and time. However, many of the existing bicycle and pedestrian facilities are not comfortable enough for children and families. Figure 3 shows the location of school districts throughout the City. Figure 4, Figure 5, and Figure 6 show enrollment boundaries, where present, for elementary, middle, and high schools.

Many of the existing bicycle and pedestrian facilities are not comfortable enough for children and families.

MODESTO AREA SCHOOL DISTRICTS

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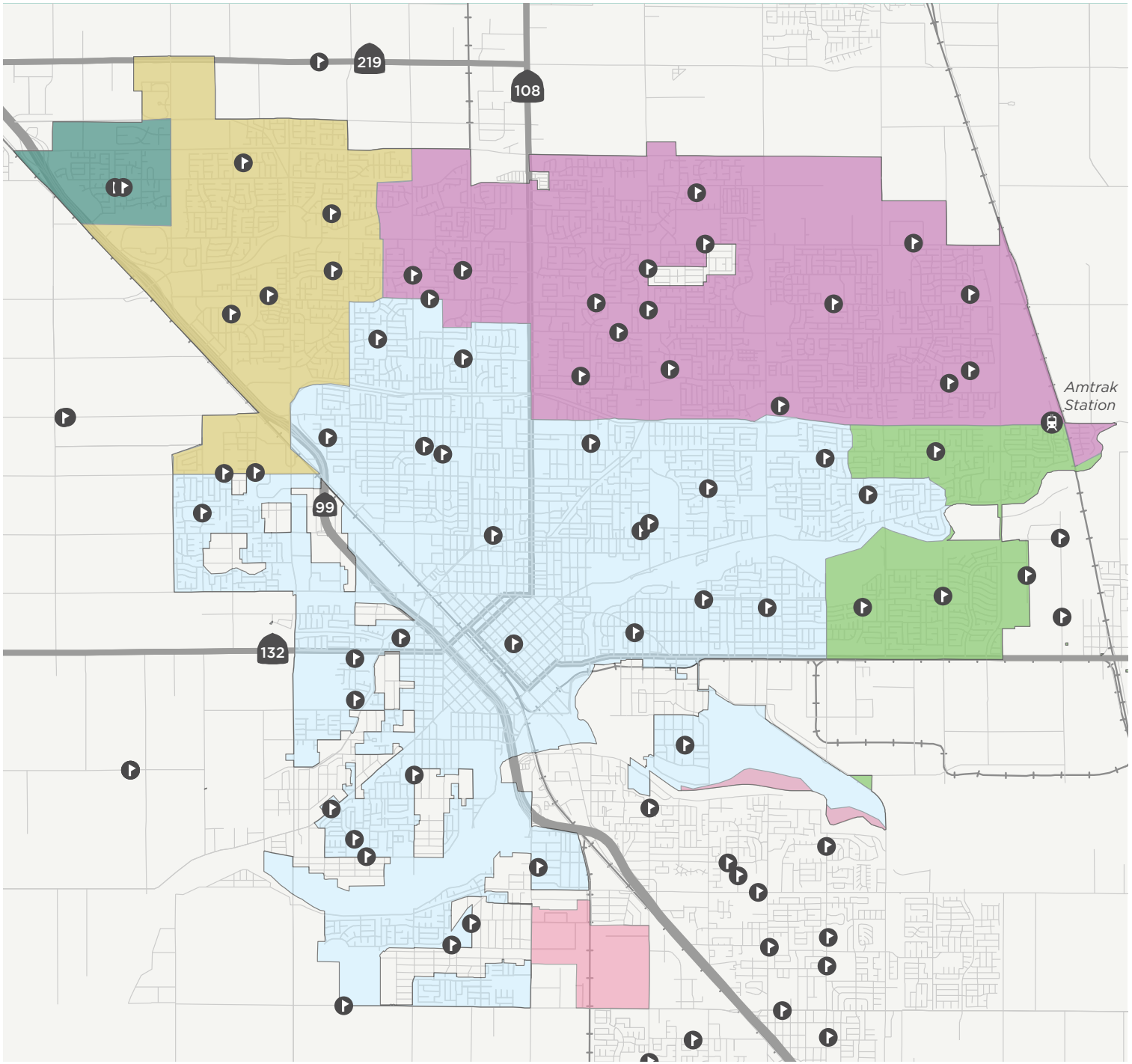
Existing Bikeways

School District

- Ceres Unified
- Empire Union
- Salida Union
- Stanislaus Union
- Sylvan Union
- Modesto Districts
- School



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Map produced December 2018.

Figure 3: School Districts

MODESTO AREA ELEMENTARY SCHOOLS

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TRANSPORTATION PLAN

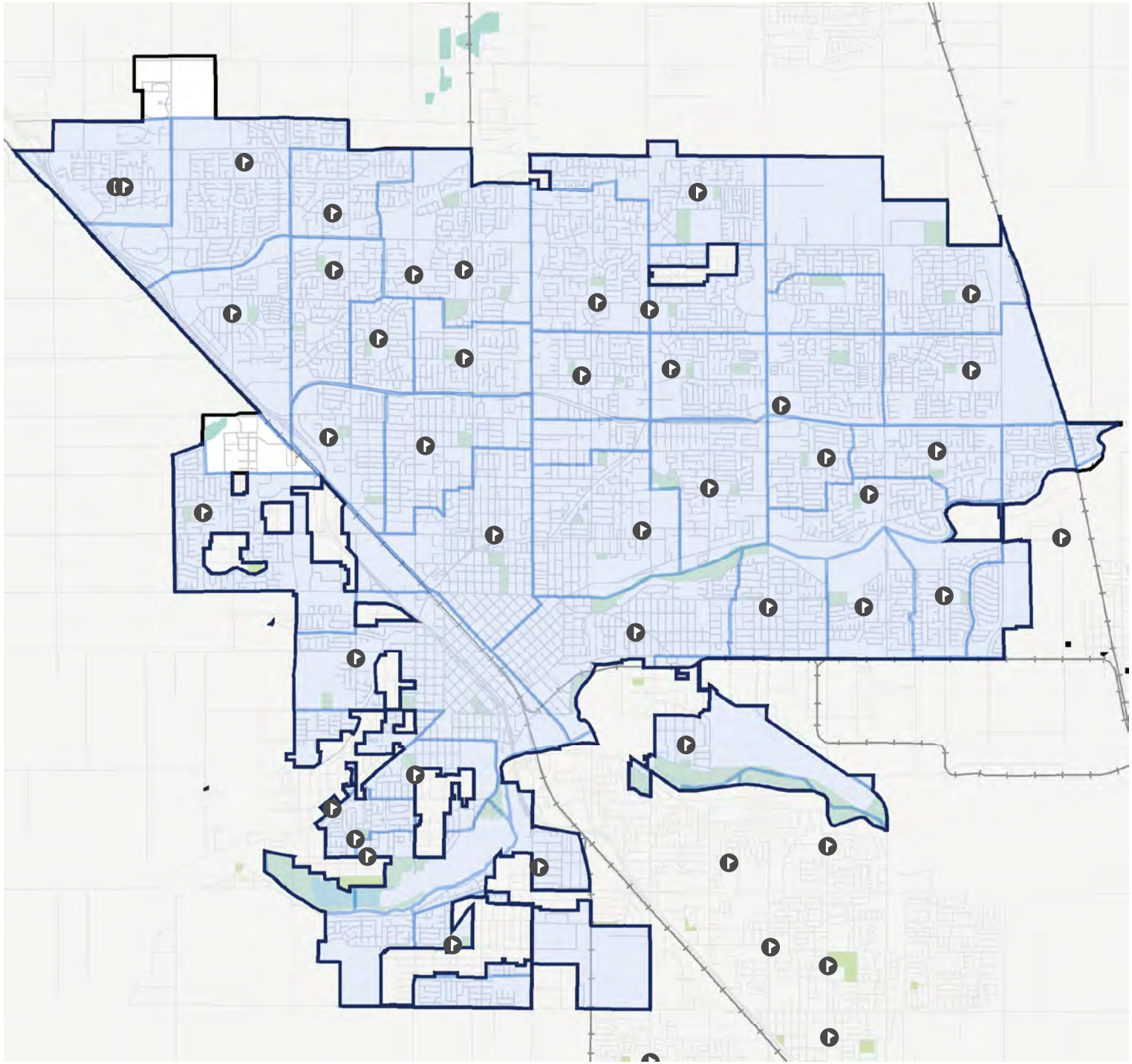


Figure 4: Elementary School Enrollment Areas

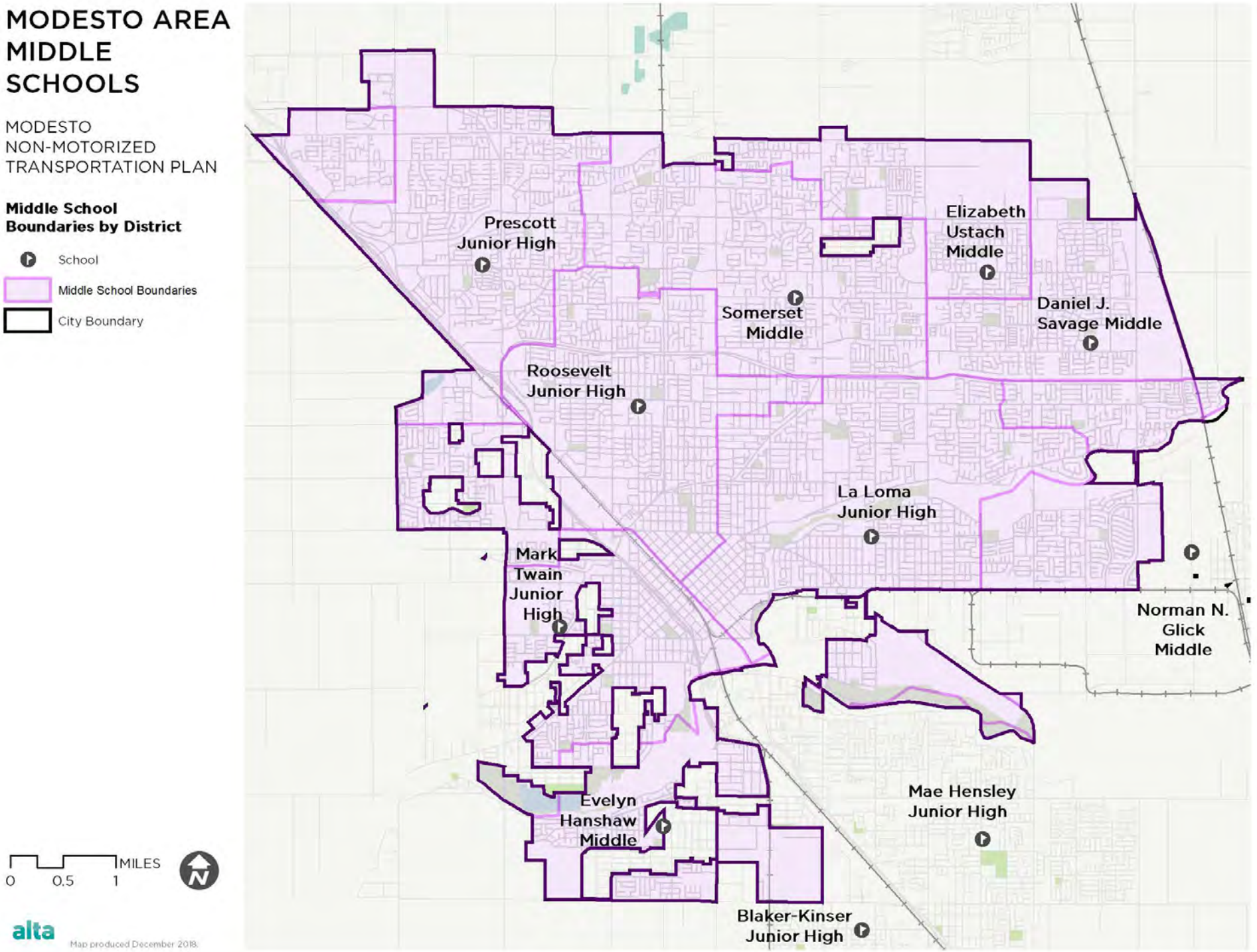


Figure 5: Middle School Enrollment Areas

MODESTO AREA HIGH SCHOOLS

MODESTO
NON-MOTORIZED
TRANSPORTATION PLAN

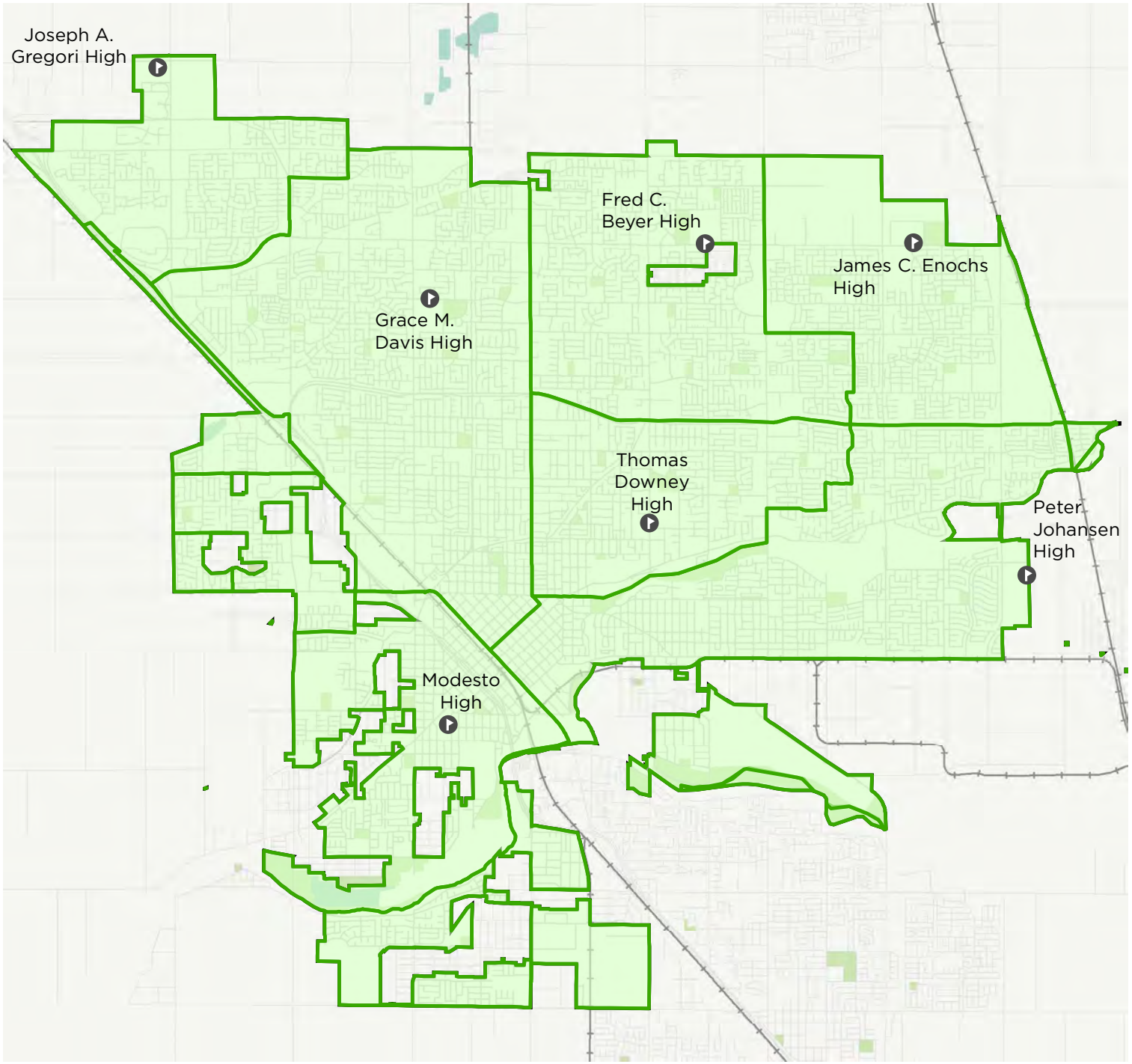


Figure 6: High School Enrollment Areas

PARKS

There are 76 city-operated parks, including splash playgrounds, a wading pool, tennis courts, athletic fields, and picnic areas, within Modesto. Modesto currently has over 17 miles of trails, including the Virginia Corridor facility. Figure 7 shows the locations of parks and trails across Modesto.

TRIP DEMAND

StanCOG's Travel Demand Model strives to predict where increases in walking, biking, and driving trips will occur based on population growth, planned developments, and infrastructure projects, current travel patterns, and other conditions. Figure 8 maps the density of current trips and shows areas (crosshatched) where trips are predicted to increase. These future trips can be good candidates for active transportation, especially for local trips to schools, parks, and other neighborhood destinations. Much of Modesto's trip growth is expected to occur in the northwest and northeast areas, downtown, and south of Yosemite Boulevard.

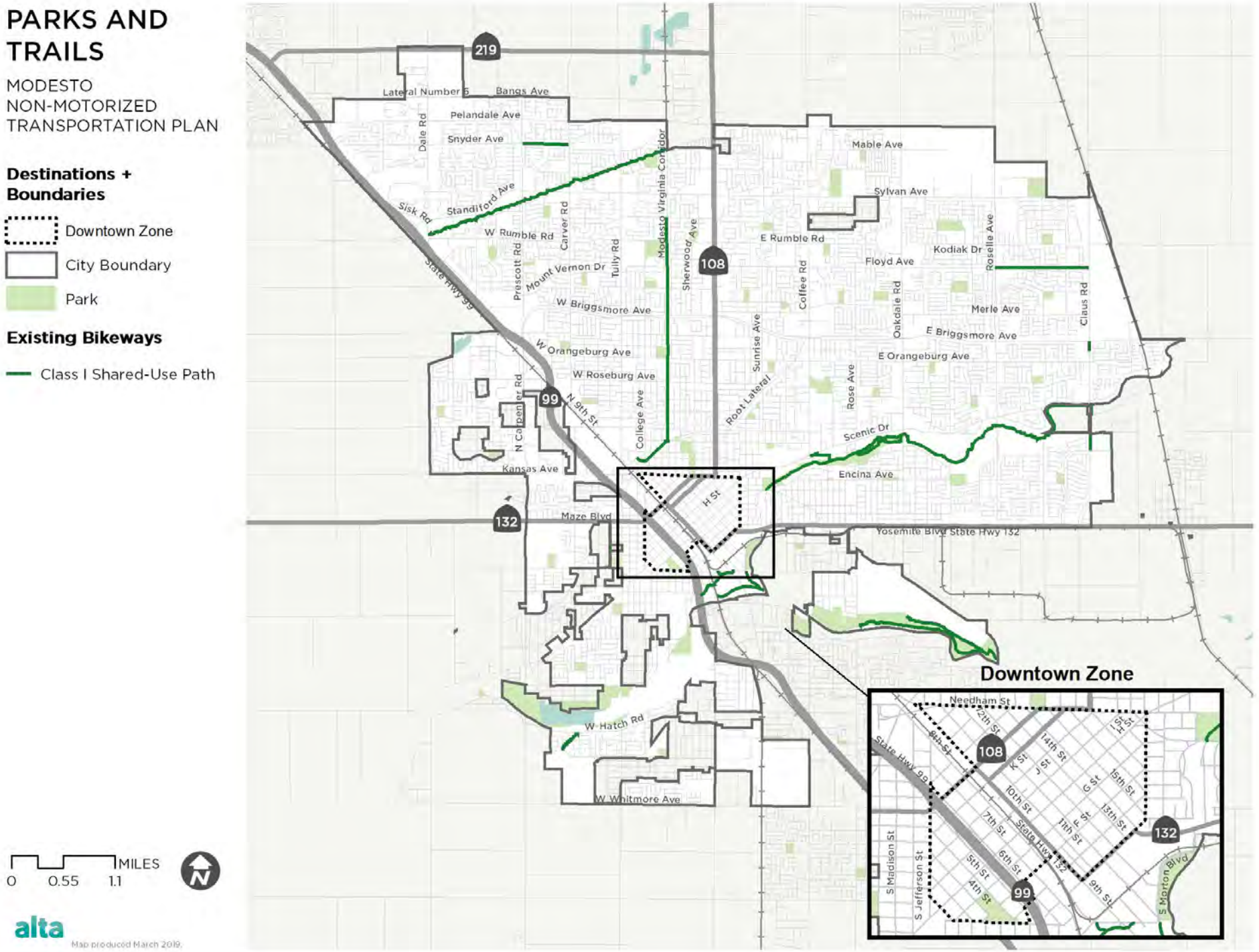


Figure 7: Parks and Trails

TRIP DEMAND

MODESTO CA ACTIVE TRANSPORTATION PLAN

Trip Density per TAZ (2015)

- No Trips
- Low Density
- Medium Density
- High Density

Projected increase in trips in 2042

Destinations + Boundaries

- Amtrak Station
- City Boundary

0 0.5 1 MILES

alta PLANNING + DESIGN

Map produced April 2019.
Source: STANCOG

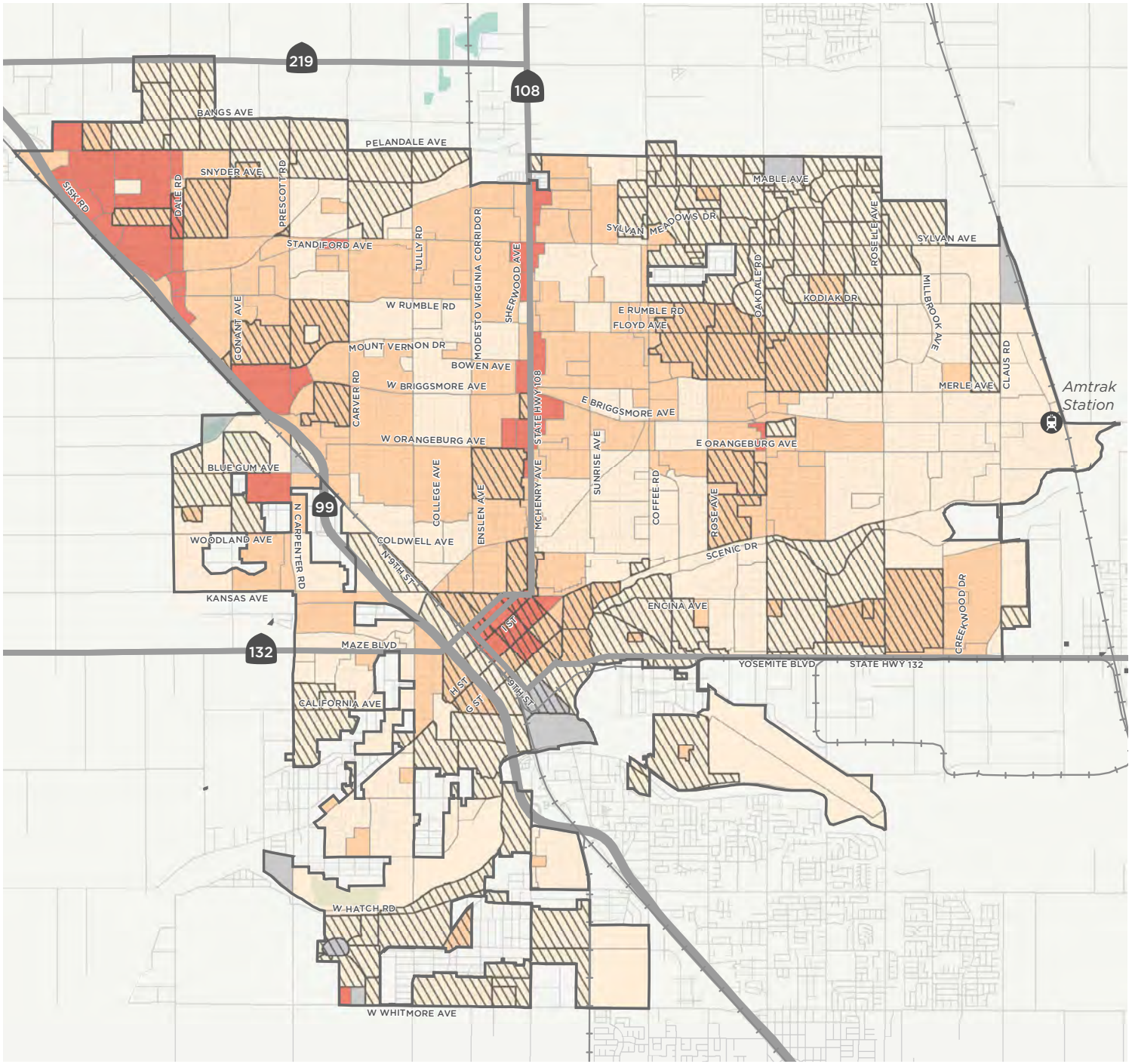


Figure 8: Trip Demand Projection

Connectivity

BICYCLE NETWORK

Modesto's existing bicycle network has just over 100 miles of facilities. It consists of off-street trails and various on-street facilities. Around 80% of the city's facilities are on-street bikeways, mostly bicycle routes. The Virginia Corridor, canal trails, and river/creek trails make up most of Modesto's off-street trail system. Figure 9 shows Modesto's existing bikeways, and Table 5 provides mileage statistics by facility type. Definitions of each facility are provided in the next section.

Many of the city's arterial and collector streets have bicycle facilities, providing some connectivity across the city. Few dedicated routes within and through residential neighborhoods limit comfortable access to the formalized network.

Table 5: Existing Bikeways (Miles)

Path Type	Miles
Shared-use Path	17
Bicycle Lane	26
Buffered Bicycle Lane	17
Bicycle Route	40
Bicycle Boulevard	0
Separated Bikeway	4
TOTAL	**104**

BICYCLE FACILITY TYPES

Shared-use Path (Trail)

Dedicated paths for walking and bicycling separated from the roadway.

Bicycle Lane

Striped lanes for bicyclists.

Buffered Bicycle Lane

Bicycle lanes that include a striped buffer area either between the bicycle lane and the travel lane or between the bicycle lane and parked cars (sometimes in both places).

Bicycle Route

Signed routes for people biking on low-speed, low-volume streets where roadway space is shared with people driving.

Bicycle Boulevard

Bicycle routes that are enhanced with traffic calming features or other treatments that prioritize bicyclist comfort. A toolkit of bicycle boulevard treatments is available later in this chapter. Treatments will be specific to each corridor and determined based on community input and planning/engineering judgment.

Separated Bikeway

On-street bicycle facilities with physical separation between modes. Types of separation can include bollards, planter boxes, vehicle parking, curbs, or raised facilities.

EXISTING BIKEWAYS

NON-MOTORIZED TRANSPORTATION PLAN

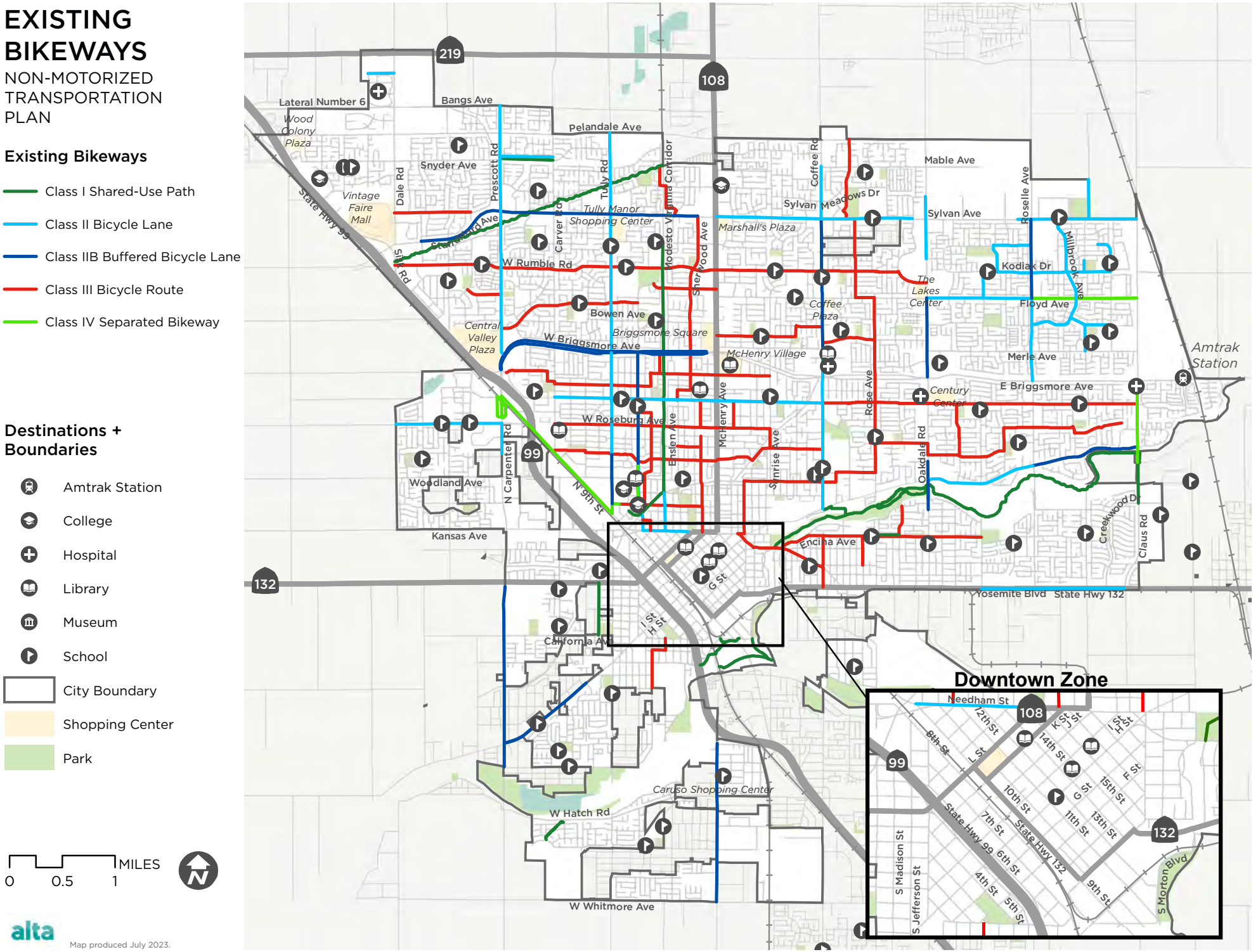


Figure 9: Existing Bikeways

Comfort

The City has about 101 miles of existing bicycle facilities. While people biking will have different tolerances for comfort and stress, typically speaking, separated bikeways, bicycle boulevards, and shared-use paths/trails are considered low-stress facilities. Only about one-third of Modesto's existing facilities fall within those categories. Sidewalk conditions, separation from vehicle lanes, lighting, shade, among other factors, can influence the comfort of people walking. The Level of Traffic Stress (LTS) analysis measures how bikeable or walkable a street is based on some of the above factors. Roads are categorized as LTS 1, 2, 3, or 4; lower numbers indicate increased comfort for more people biking or walking.

Within Modesto, LTS 1 corridors include most small residential streets and all trails. LTS 2 and 3 corridors include most non-residential roads with a bicycle facility. The most stressful LTS 4 facilities include high-speed arterials with minimal or no bicycle facilities like McHenry Avenue or Yosemite Boulevard. Figure 10 shows the results of the LTS analysis.

LEVEL OF TRAFFIC STRESS

MODESTO CA ACTIVE TRANSPORTATION PLAN

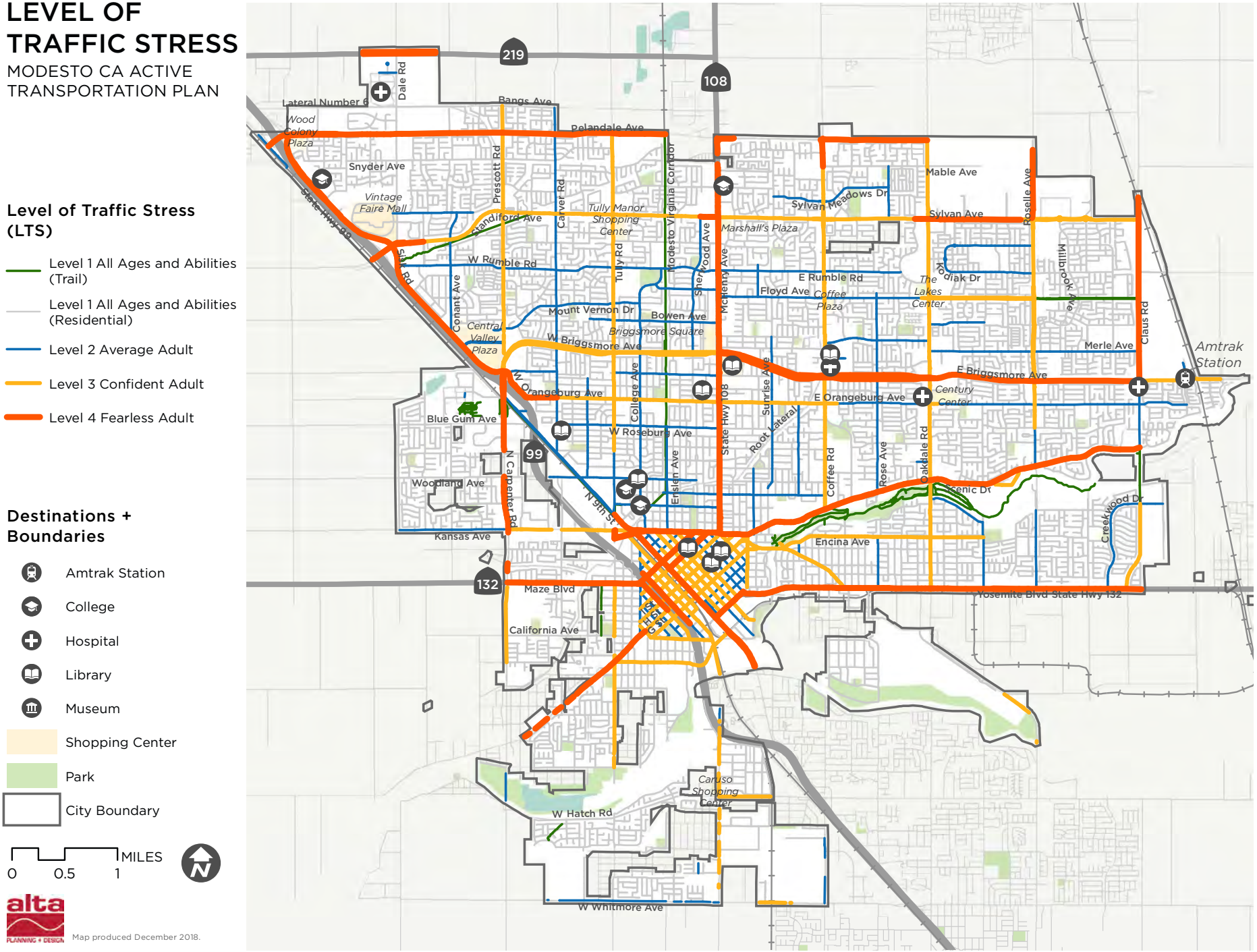


Figure 10: Level of Traffic Stress

Safety

Collisions were examined between 2013-2017. Despite being a relatively small part of all trips, bicyclist- and pedestrian-involved collisions account for over 15% of all collisions (881 pedestrian- or bicycle-involved collisions). In that same five-year period, bicyclist injuries have risen by 8%, and pedestrian injuries have increased by 33%.

Between 2013-2017, there were 448 pedestrian-involved collisions, including 23 pedestrian fatalities. In that same period, there were 433 bicyclist-involved collisions, including eight fatalities. Thirty-one active transportation users died in this period. Across all modes in the same period, there were 76 fatalities. Walking and biking fatalities account for over 40% of Modesto traffic-related deaths. Four corridors recorded multiple pedestrian or bicyclist fatalities: McHenry Avenue (4), SR-99 (4), Tully Road (3), and Yosemite Boulevard (2).

HIGH INJURY NETWORK

Several corridors throughout the City had a high concentration of pedestrian- or bicycle-involved collisions. Corridors with elevated collision levels were grouped to create a high injury network. The corridors, grouped by direction, are noted in the list that follows:

East-West Corridors

- Standiford Avenue/Sylvan Avenue
- Mount Vernon Drive
- W. Orangeburg Avenue
- Yosemite Boulevard (SR-132)

North-South Corridors

- Prescott Road
- Carver Road
- McHenry Avenue (SR-108)
- Oakdale Road
- Tully Road
- Coffee Road

Downtown and South of SR-99

- J Street
- I Street
- H Street/Paradise Road
- D Street (SR-132)
- S. Martin Luther King Jr. Drive/Sutter Avenue

Many of these corridors provide essential connections to neighborhood-serving destinations. Still, they are high-speed collector and arterial streets that are very uncomfortable and uninviting to people walking, biking, and rolling.

The following heatmaps in Figures 11 and 12 show the approximate location of the bicycle- and pedestrian-involved collisions.

BICYCLE COLLISIONS

MODESTO CA ACTIVE TRANSPORTATION PLAN

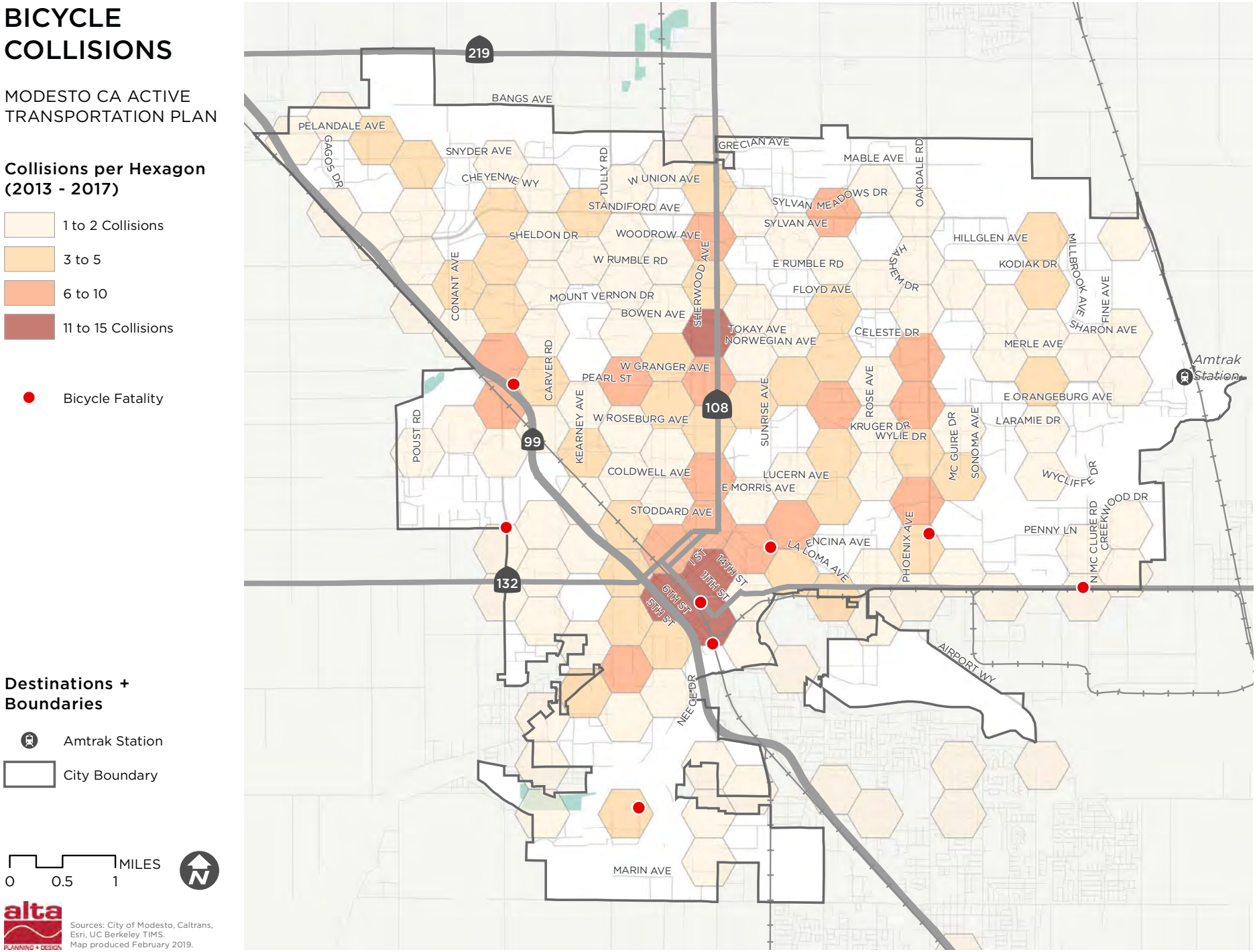


Figure 11: Bicycle Collisions

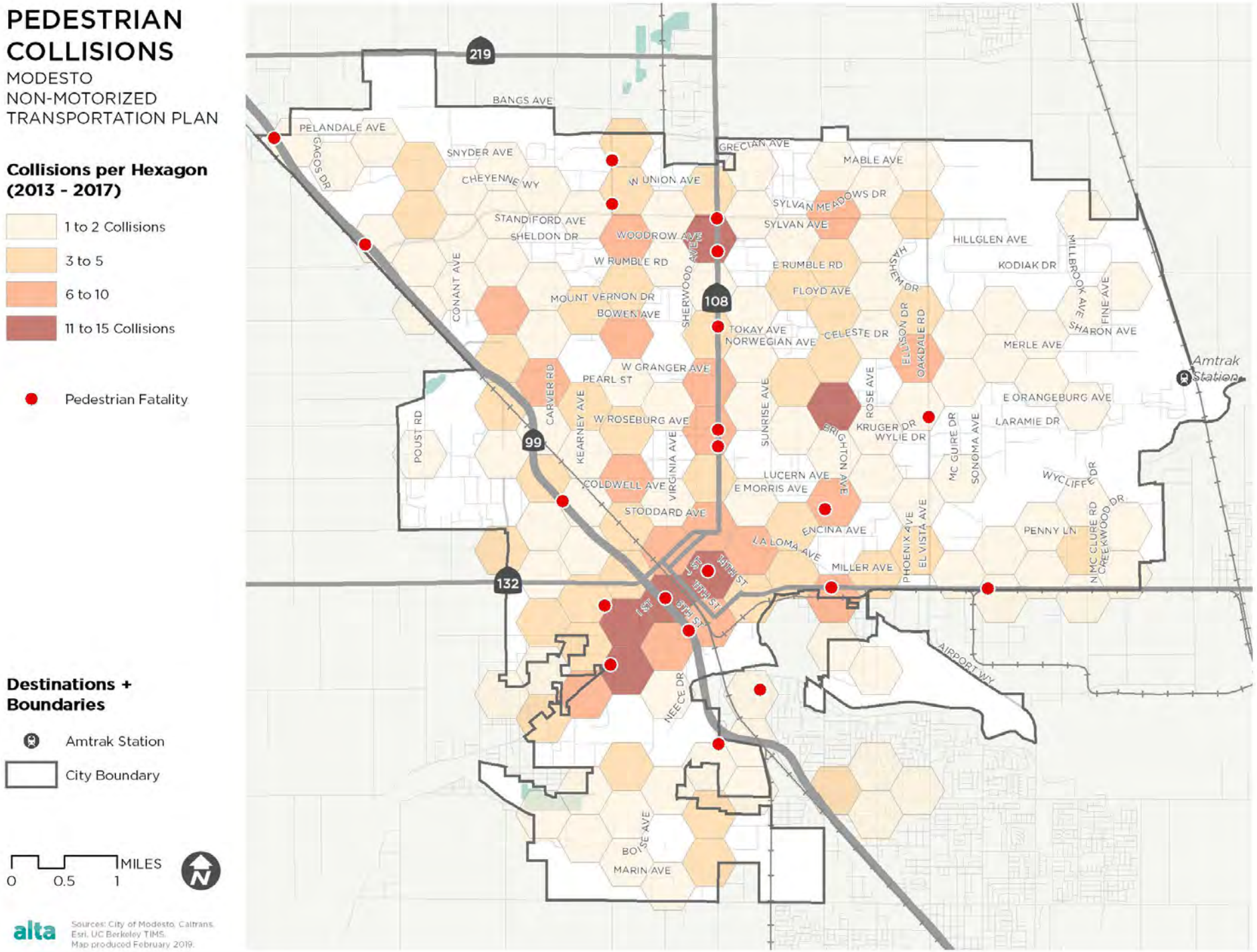


Figure 12: Pedestrian Collisions

Accessibility

An accessibility analysis was conducted to study how easily residents can access important neighborhood destinations using low-stress routes. Accessibility was studied around schools, parks, and major commercial centers. Combining this analysis with the LTS analysis creates a more comprehensive understanding of conditions around each set of destinations. Highlights from each of the analyses are below:

SCHOOLS

Schools across all levels are reasonably distributed across the City. The relative distance between each student's residence and the school is a huge factor in determining the practical transportation options. School enrollment boundaries, where present—see Figures 3–6 on pages 30–33—somewhat control travel distance, but larger enrollment areas mean many families will live too far to walk or bike, especially for middle and high schools. In many cases, schools are not centered within these areas, creating inequitable distances. If a family does not live within a reasonable walking (1/4 mile – 1 mile) or biking (up to 2 miles) distance, the lack of low-stress facilities can discourage families from using active transportation. Some may choose to take a slightly more circuitous route to avoid stressful areas, but many may choose to use a different travel mode.

PARKS

Across the City, most residents are within a reasonable distance of a park. The dozens of City parks and other recreational facilities provide most residents with relatively short, low-stress access. Crossing wider streets is necessary for some residents to reach parks. This can be challenging for some people, especially children and seniors, who are walking, biking, or rolling. Crossing improvements that make it easier and more accessible for people to walk, bike, or roll can make those trips more inviting. It is also is important to improve end-of-trip facilities (discussed in Chapter 5) at parks.

SHOPPING

Most Modesto residents can access their closest shopping centers by bicycle using low-stress streets without having to travel very far out of direction. Many of these tend to front a large collector or arterial road, creating an uncomfortable end and beginning to those trips. If someone wants to travel to a further commercial center, they will likely have to cross or travel on a higher-stress corridor at some point along their journey. While many of the city's crosstown streets have an existing facility, very few of them are low-stress.

If a family does not live within a reasonable walking distance, the lack of low-stress facilities can discourage families from using active transportation.

Barriers

Natural and infrastructure barriers limit connectivity, alter travel behavior, and directly affect modal and route choices. Natural barriers include rivers, steep terrain, and canals. Infrastructure barriers include freeways, highways, and railroad tracks. In addition to these “linear” barriers, major roadway crossings and larger intersections can also act as barriers, especially for vulnerable road users like seniors and children. Many existing walking, biking, and rolling facilities (sidewalks and bike lanes) typically change or are not present at most crossings of these barriers.

NATURAL BARRIERS

Modesto's natural barriers include the Briggsmore Avenue Lateral, Root Lateral, Moulton Lateral, Dry Creek crossing, and the Tuolumne River.

INFRASTRUCTURE BARRIERS

Multiple state highways cross Modesto: SR-132 (Yosemite Blvd./Maze Blvd.), SR-108 (McHenry Ave.), and SR-99 (Golden State Highway). Segments of 9th Street, K Street, L Street, 6th Street, and Needham Street in downtown are also designated as part of the State Highway System. State Route-99 is the only conventional freeway of this group. However, the other routes still carry high volumes of cars at high travel speeds and have limited signalized crossing locations.

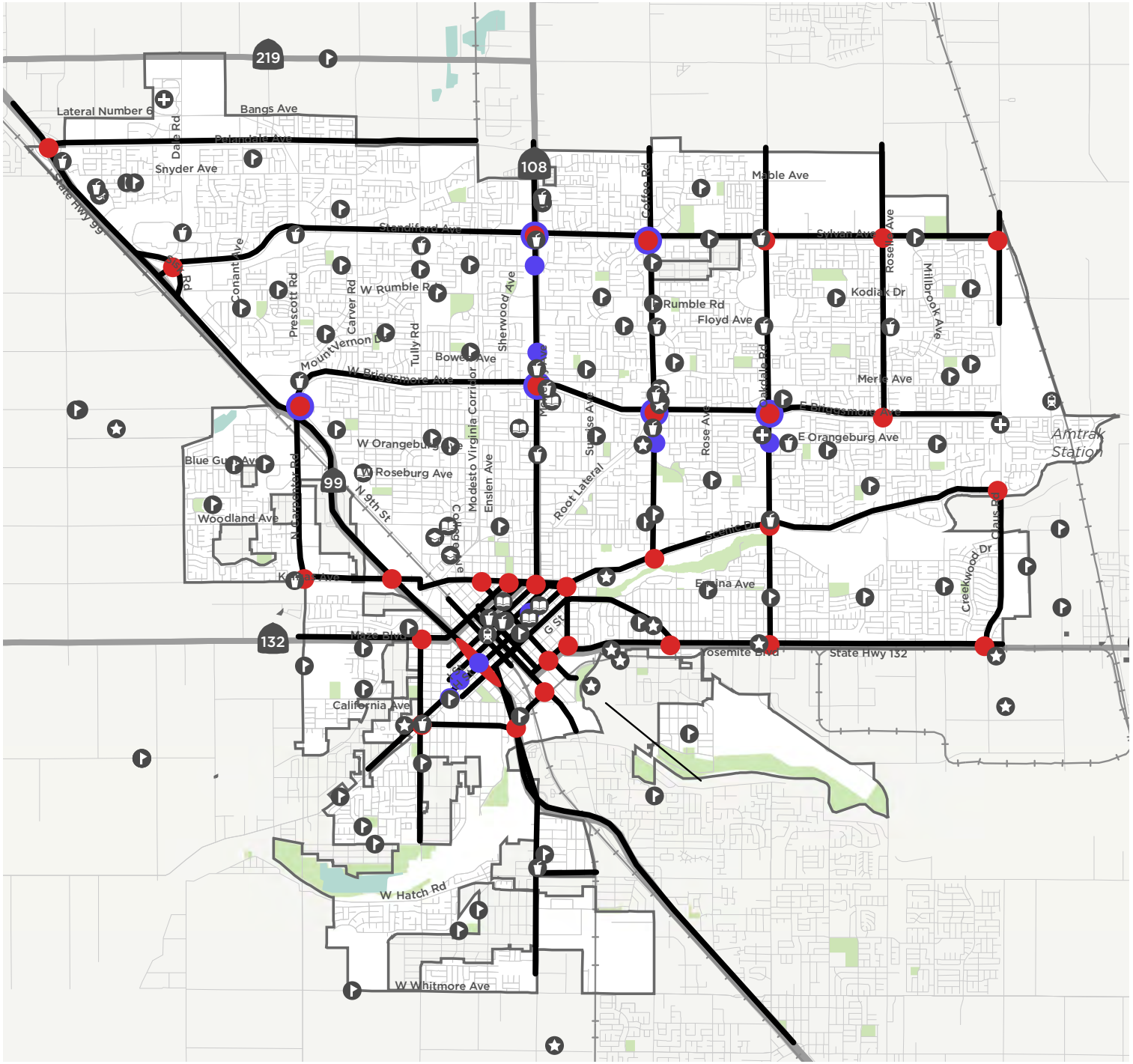
Railroad tracks also act as long linear barriers with limited formalized crossing opportunities. Within Modesto, railroad tracks generally run parallel to 9th Street and parallel to Santa Fe Avenue. Figure 13 shows how various barriers limit permeability, access, and connectivity across Modesto.

PERMEABILITY

MODESTO
NON-MOTORIZED
TRANSPORTATION PLAN

Destinations + Boundaries

- Transit Hub
- Shopping Center
- School
- Major Employer
- College
- Hospital
- Library
- City Boundary
- Park
- LTS 3 & LTS 4 Corridors
- Intersection Barriers
- High Collision Locations



MILES
0 0.5 1

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Map produced March 2019.

Figure 13: Permeability

SUMMARY: OPPORTUNITIES AND CONSTRAINTS

Modesto has many transportation corridors that, if enhanced, can foster and support comfortable, low-stress active transportation.

Extending existing trails and building new trails along canals and other rights-of-way would create new off-street facilities and potentially improve the crossings of barriers. Many of Modesto's arterial and collector streets are wide, multilane streets, primed for developing a low-stress crosstown network. In many cases, existing bicycle facilities can be enhanced with striped buffers or physical protection (i.e., upgrading bike lanes to buffered bike lanes or separated bikeways).

Implementing traffic calming on neighborhood streets will make those streets safer for all transportation users: people walking, biking, rolling, and driving. Many of these streets already have great qualities, like tree shade and lower traffic volumes and speeds. Formalizing streets as dedicated multimodal corridors will start forming a high-quality neighborhood low-stress network. This will provide essential linkages to crosstown facilities and be the backbone for most local walking and bicycling trips.

There are many constraints that the City will have to work through as they move toward implementation. Streets have limited available width/right-of-way and competing modal uses. Some project recommendations may require trade-offs or road diets, most commonly on arterial or collector streets. Railroad crossings, highway interchanges, underpasses/overpasses, and other large projects each present a unique challenge and can require coordination across multiple agencies.

CHAPTER 4

Community Engagement

ENGAGEMENT STRATEGY

Three goals guided this Plan's community engagement process:

- Reach a diverse audience
- Maximize visibility and transparency
- Make engagement meaningful

The City used several different methods to promote the planning process and engage with the community, including social media, email newsletters, pop-up events, an interactive webmap, and community workshops. The COVID-19 pandemic led the City to create an interactive virtual open house for the second phase of the community engagement process. Engagement activities are described in the following section.

COMMUNITY ENGAGEMENT ACTIVITIES

Bike to Work Day 2019

The project team hosted a pop-up event during the City's Bike to Work Day event in downtown. The City gathered input on existing conditions and promoted the interactive webmap. Over 75 comments were logged about walking, biking, and rolling issues and opportunities. Common themes from this pop-up included expanding trails and paths throughout the City, extending Virginia Corridor, and improving the bicycle network's overall connectivity.

Family CycleFest 2019

Family CycleFest, held in May, is a fun, outdoor event dedicated to promoting bicycles and bicycle safety. The project team hosted another pop-up event to listen to the community about walking, biking, and rolling. Over 60 comments were gathered. Many families made comments wanting safer routes to schools and parks. Other common themes from the event included a desire for traffic calming on residential streets, improving the connection between the Virginia Corridor and downtown, and closing sidewalk gaps.

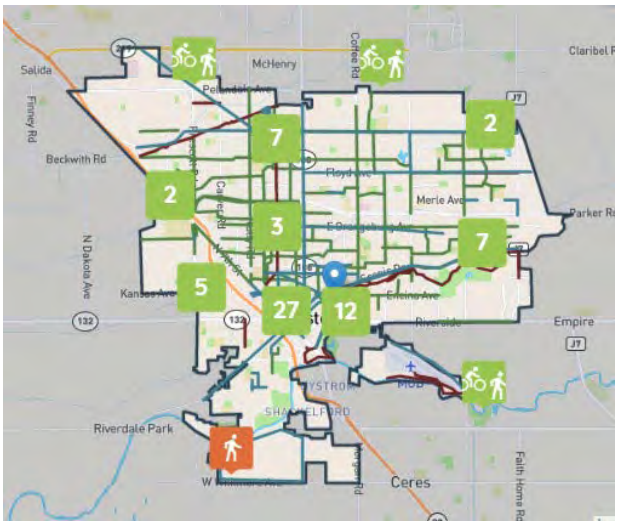
Community Workshop

In November of 2019, the City hosted a community workshop to engage with residents on existing conditions. In addition to reviewing components of the existing conditions analysis, attendees could provide feedback on existing conditions, share information on places they would walk and bike to, review proposed pedestrian priority areas, and share their priorities for the future of walking and biking. About 20 residents attended the meeting.

Online Engagement

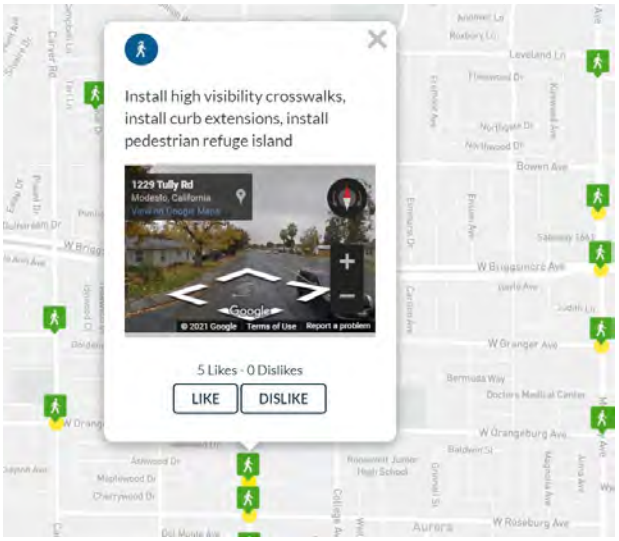
INTERACTIVE WEBMAP

The first phase of community engagement included an interactive webmap. The webmap allowed users to leave comments on existing bicycle facilities, draw their preferred walking and bike routes, and drop pins at locations they had comments on. About 70 comments were provided on the webmap. Roughly one-third of the comments were located in downtown Modesto. Common themes from the webmap included improving connections between neighboring areas and increasing access to trails across the City.



VIRTUAL OPEN HOUSE

Restrictions from the COVID-19 pandemic prevented the City from hosting in-person events for the second community engagement phase. The City created a virtual open house to present the key themes from community engagement and the draft bicycle and pedestrian recommendations. Through an updated interactive webmap, users could like, dislike, and comment on the draft pedestrian and bicycle recommendations. The virtual open house was available in both English and Spanish.



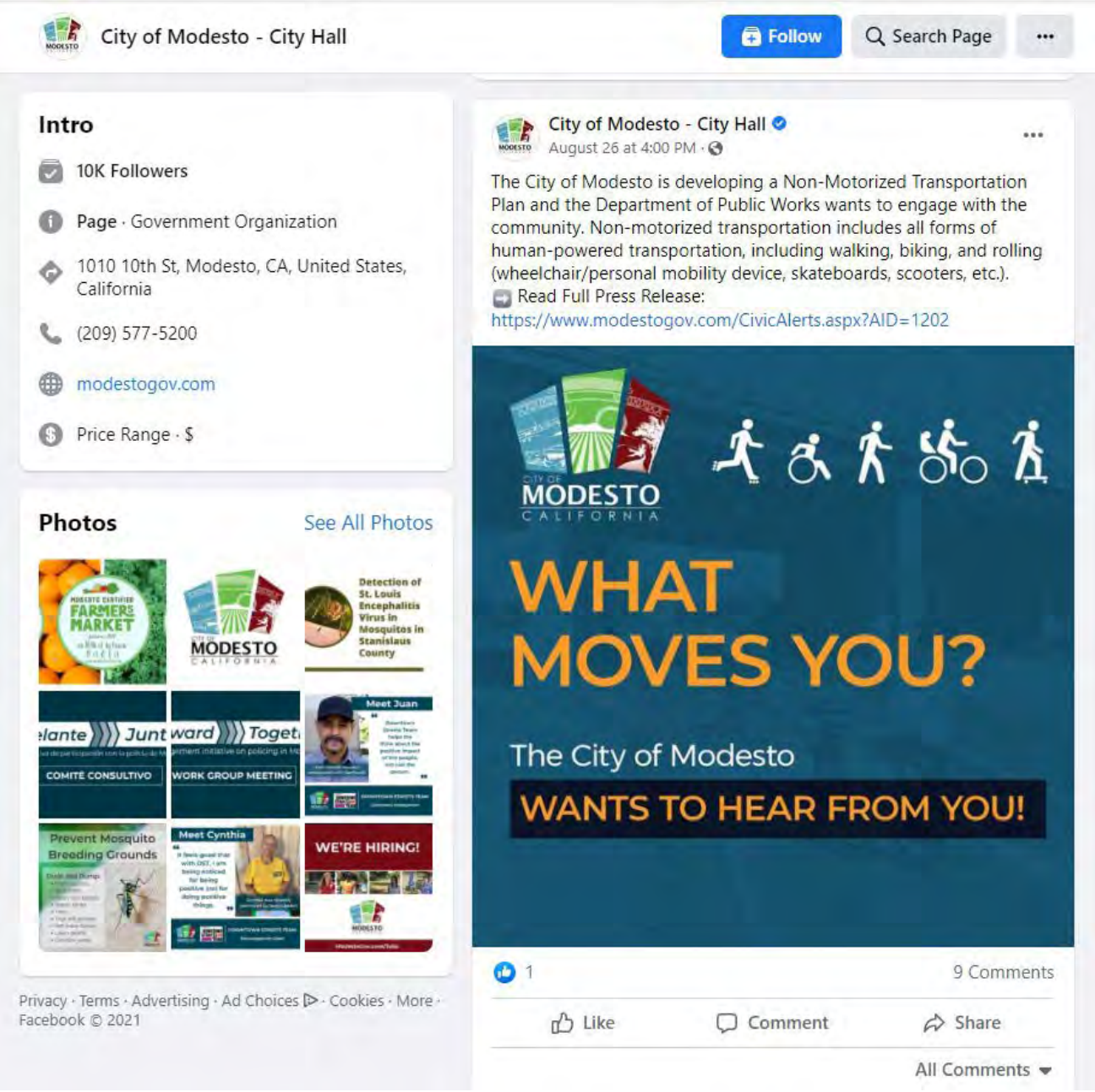
The project team promoted the virtual open house using City social media accounts and targeted social media ads. The project website was also promoted in a Modesto Bee newspaper article. Over 1,800 residents visited thevirtual open house during the comment period, providing more than 1,600 likes/dislikes on pedestrian and bicycle projects.

StanCOG BPAC Meetings

The City presented updates on the Plan twice to the StanCOG BPAC. Members were provided information on the Plan process and provided feedback on existing conditions and draft recommendations.

Stakeholder Involvement

To further expand the reach of the Plan's engagement, the project team coordinated with multiple stakeholder organizations to help promote the Plan's engagement efforts. These groups help spread the word about Plan-related events and encouraged their members to participate.



ENGAGEMENT THEMES

Four common themes emerged across community engagement methods. These themes were the guiding principles used to develop the pedestrian and bicycle recommendations presented in the next chapter. Each theme is detailed below:

1. Improve safety and access to school

Improving safety for students and families walking and biking to school was one of the top priorities the City heard from residents. Families had concerns about both walking and biking around schools. Many stated that regardless of mode, wide streets, fast-moving traffic, and uncomfortable crossings discouraged them from using active transportation. Residents who lived near a street(s) without sidewalks added that the missing infrastructure adds to their concerns.

2. Build more crosstown trail facilities like the Virginia Corridor

Virginia Corridor is one of the jewels of Modesto's active transportation network. The trail is one of the most loved pieces of Modesto's network by residents. Residents stated that they would be like to see the City build more trails like it across Modesto. These corridors would provide safe, comfortable, off-street crosstown connectivity, something many residents believe the City currently lacks. Residents use the Virginia Corridor for many purposes, including commuting and recreating. Building similar facilities across Modesto would expand the health and environmental benefits to these new areas of the city.

3. Slow traffic on residential streets

As residents made clear, the key to any successful active transportation network starts with accessibility from their door. Slowing down vehicle traffic and providing walking and bicycle enhancements in residential areas will go a long way to shifting travel behavior on local neighborhood trips. Traffic calming residential streets work in tandem with safe routes to school goals and improves connections to crosstown facilities.

4. Make it safer and more comfortable to cross large streets and to cross streets near neighborhood-serving destinations

Many residents cannot walk or bike to a local destination, like a park, school, library, or corner store, without needing to cross at least one large street. Residents stated that many arterial and collector street crossings feel uncomfortable, especially at uncontrolled locations. They also noted that bicycle facilities dropping at some intersections was a design consideration they would like addressed. Residents also shared crossing concerns about off-street facilities like Virginia Corridor; for mid-block crossings and wanting better connectivity/crossing options into downtown.

CHAPTER 5

Recommendations

OVERVIEW

Built on the needs and opportunities identified by evaluating existing conditions, community input, and data-driven analyses, this chapter presents the recommended bicycle and pedestrian networks for Modesto. Recommendations described in this Plan serve as a blueprint to create successful, well utilized, and safe pedestrian and bicycle networks. Project recommendations outside of Modesto's rights-of-way play an essential part in the overall comprehensiveness of the active transportation network. Implementing these projects will require additional coordination with outside agencies such as Caltrans, county agencies, or utilities. This Plan proposes 192 miles of new or upgraded bikeways and pedestrian infrastructure improvements at 109 locations.

STRATEGIES

Bicycle Recommendation Development

Bicycle recommendations were developed using a context-sensitive approach that incorporated many factors, including street width, lane configuration, parking, land uses, barriers, nearby destinations, and community engagement. Recommendations focus on connecting residents to schools, shopping areas, parks, trails, and downtown safely and comfortably.

The low-stress network includes all shared-use paths, bicycle boulevards, and separated bikeways (existing and proposed). This network shows where most people biking could travel comfortably across the City.

Pedestrian Recommendation Development

Pedestrian recommendations are concentrated within pedestrian priority areas (PPAs). PPAs were developed based on many factors including the results of the existing conditions analysis (connectivity, demand, and accessibility), proximity to destinations including schools, parks, commercial areas, downtown, locations with high volumes of foot traffic, and prioritizing areas with a history of pedestrian-involved collisions. Figure 14 shows the location of Modesto's nine pedestrian priority areas. Spot recommendations seek to improve the safety and comfort of people walking and rolling along or across streets.

PEDESTRIAN PRIORITY AREAS

MODESTO
NON-MOTORIZED
TRANSPORTATION PLAN

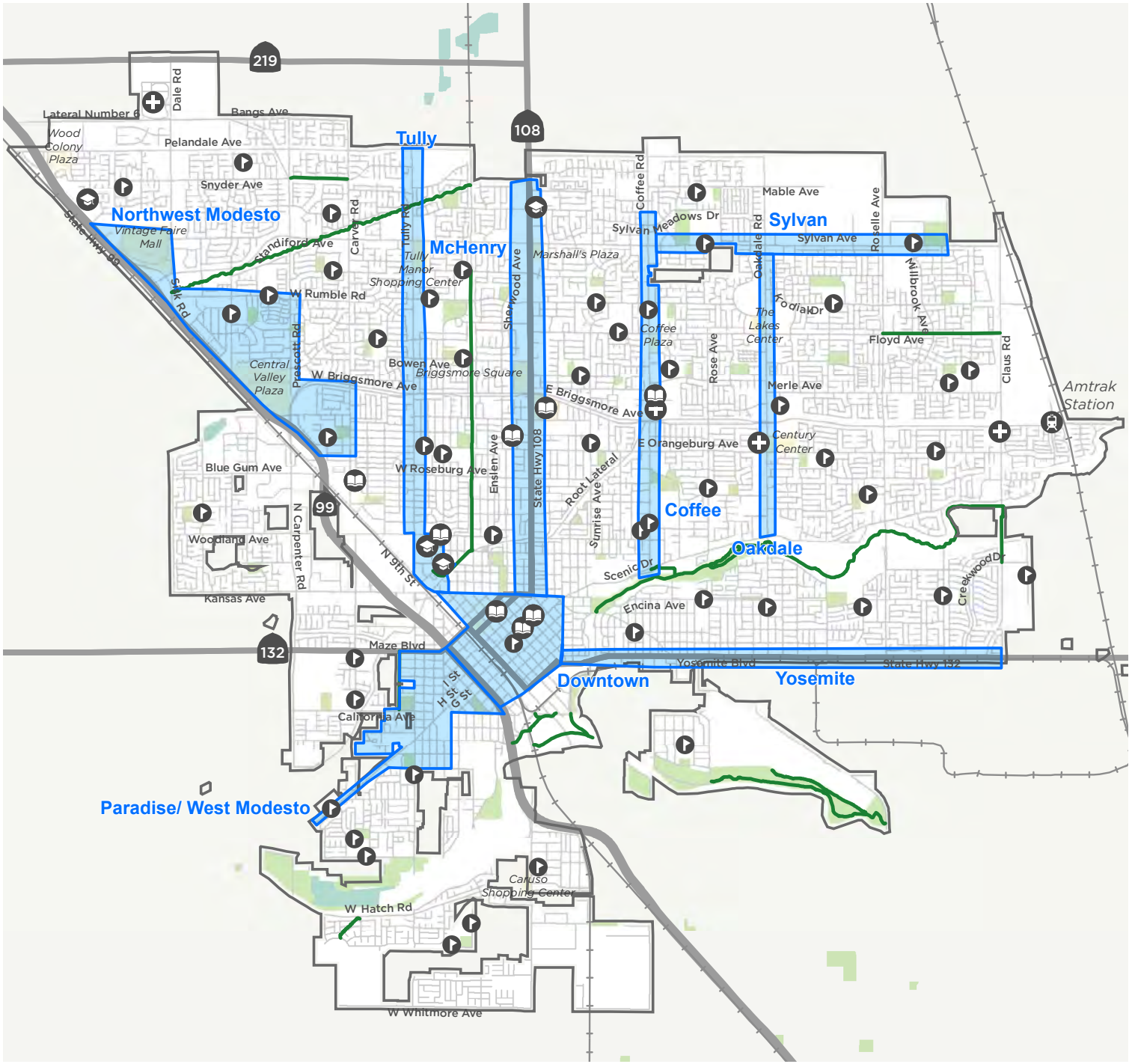


Figure 14: Pedestrian Priority Areas

BICYCLE RECOMMENDATIONS

Bicycle Facilities

CLASS I SHARED-USE PATH (TRAIL)

Dedicated paths for walking and bicycling completely separate from the roadway.

CLASS II BICYCLE LANE

Striped lanes for bicyclists.

CLASS IIB BUFFERED BICYCLE LANE

Bicycle lanes that include a striped "buffer" area either between the bicycle lane and the travel lane or between the bicycle lane and parked cars (sometimes in both areas).

CLASS III BICYCLE ROUTE

Signed routes for bicyclists on low-speed, low-volume streets where roadway space is shared with motorists.

CLASS IIIB BICYCLE BOULEVARD

Bicycle routes that are further enhanced with traffic calming features or other treatments to prioritize bicyclist comfort. A toolkit of bicycle boulevard strategies can be found later in this chapter. Treatments will be specific to each corridor and determined based on local community input and planning/engineering judgment.

CLASS IV SEPARATED BIKEWAY

On-street bicycle facilities with a physical barrier between the bicycle space and motor vehicle lanes. Barriers can include bollards, curbs, elevation, or parking.

Bicycle Boulevard Toolkit

Unlike other bicycle facilities, bicycle boulevards are unique in that there are no specific standards or treatments. Bicycle boulevards can be implemented in various ways to create an environment where bicycle travel is prioritized in a shared space with cars. Individual corridors will be analyzed to determine which treatments reflect the solutions that will bring about the highest increase in bicyclist comfort and safety while respecting and coordinating with the needs and desires of nearby residents and stakeholders. Treatments will vary from simple signage and striping only to more advanced intersection redesigns. This Plan does not provide specific treatment recommendations for individual bicycle boulevard corridors.

There are three primary categories of improvements:

- Signs and pavement markings
- Vehicle speed management
- Vehicle volume reduction

SIGNS AND PAVEMENT MARKINGS

Pavement Markings

Bicycle Boulevards can have unique pavement markings or sharrows to reinforce that the street is a shared space for people biking and driving. Sharrows can also have green backing to increase driver awareness further.

Wayfinding Signs

Wayfinding is an essential component of the overall bicycle network but plays an even more significant role on bicycle boulevards. Bicycle boulevards can weave through neighborhoods, increasing the importance of the signs to help users easily navigate through their trips. Wayfinding can also help raise awareness of the presence of the bicycle boulevard, potentially generating new users.

VEHICLE SPEED MANAGEMENT

Reduce Speed Limit

In some areas, especially around schools, reducing the speed limit below 25 MPH may be a helpful strategy in slowing cars and making bicyclists and pedestrians more comfortable in the corridor.

Curb Extensions

Curb extensions extend the curb into the street. They shorten crossing distances for people walking, provide improved visibility at pedestrian and bicycle intersections, and provide additional pedestrian queuing space.

Neighborhood Traffic Circle

Neighborhood traffic circles are an alternative intersection treatment to a signal or stop sign. Traffic circles can regulate the flow of traffic while adding a traffic calming element.

Chicanes

Chicanes add gentle curves to otherwise straight streets. Adding curves to the road slows car traffic by narrowing the travel lane. The lane adjustments can be created with just striping or with offset curb extensions/ landscaping.

Chokers/Pinch Points

A pinch point narrows available roadway width with two curb extensions. Limiting the available width creates a narrow road environment where drivers drive slower.

Median Islands

Median islands create a pinch point for traffic in the center of the roadway and offer shorter crossing distances for pedestrians when used in tandem with a marked crossing.

Speed Bumps/Speed Humps/Speed Cushions

Speed bumps (and similar devices) span the roadway's width and encourage cars to slow down. Speed bumps can be designed with slots for emergency vehicle use.

VEHICLE VOLUME REDUCTION

Partial Closure Diverters

Partial closure diverters can be installed to allow bicyclists to proceed straight across the intersection while directing motorists to make left or right turns. These installations prohibit all turns from the major street onto the bikeway. Curb extensions can also be incorporated with stormwater management features and/or a mountable island to improve pedestrian crossings while allowing emergency vehicle access.

Median Refuge Island

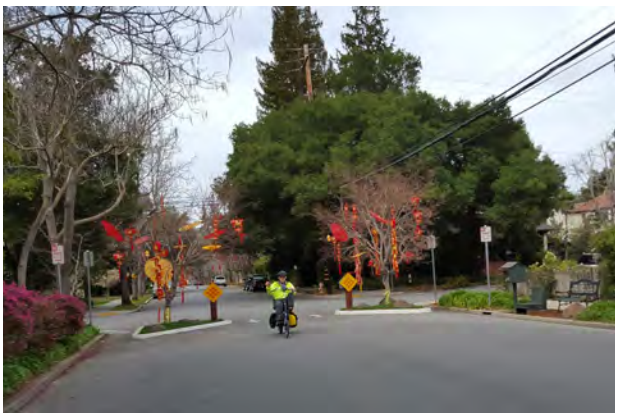
Median refuge islands restrict through and left-turn vehicle movements along the bikeway while providing refuge for bicyclists to cross one direction of traffic at a time. This treatment prohibits left turns from the major street onto the bikeway, while right turns are still allowed.

Right-in/Right-out Diverters

Right-in/right-out diverters can be installed to allow bicyclists to proceed straight through the intersection while directing motorists to turn right. The island can accommodate bicycle access to the corridor while reducing conflicts and still allowing local and emergency vehicles. Left turns from the major street onto the bikeway are typically prohibited, while right turns are still allowed.

Full Diverters

Full diverters block all motor vehicles from continuing on a neighborhood bikeway, while bicyclists can continue unrestricted. Full closures can be constructed to be permeable to emergency vehicles.



PROPOSED BICYCLE NETWORK

This Plan recommends 192 miles of new or upgraded facilities across Modesto; proposing upgrades to about 58 miles of existing facilities. Table 6 provides a breakdown of the existing and proposed bicycle networks broken down by bikeway class. Figure 15a–g is a map of the current and proposed bicycle network. When fully built out, Modesto will have 238 miles of dedicated bicycle facilities.

Figure 16 shows the low-stress bicycle network. This network consists of all existing and proposed shared-use paths, bicycle boulevards, and separated bikeways. Bicycle boulevards are important connections that can connect residents to crosstown trails and separated bikeways. This network shows were many Modesto residents and visitors can travel comfortably.

Appendix B shows all bicycle recommendations by street segment. Recommendations are sorted by bikeway class recommendation and then alphabetically.

Table 6: Bicycle Facility Network by Bikeway Classification (Miles)

	Existing Bikeways	Facilities Being Upgraded	Recommended Facilities	Full Network Build-Out
Shared-use Path	17.1	0.0	26.1	43.2
Bicycle Lane	26.0	18.8	11.2	18.4
Buffered Bicycle Lane	17.3	13.0	6.4	10.6
Bicycle Route	39.8	26.5	0.3	13.6
Bicycle Boulevard	0.0	0.0	94.9	94.9
Separated Bikeway	4.4	0.0	53.3	57.7
Total	**104.6**	**58.3**	**192.2**	**238.4**

BICYCLE PROJECT RECOMMENDATIONS

MODESTO CA
NON-MOTORIZED
TRANSPORTATION PLAN

Proposed Bicycle Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Existing Bicyle Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

0 0.5 1 MILE

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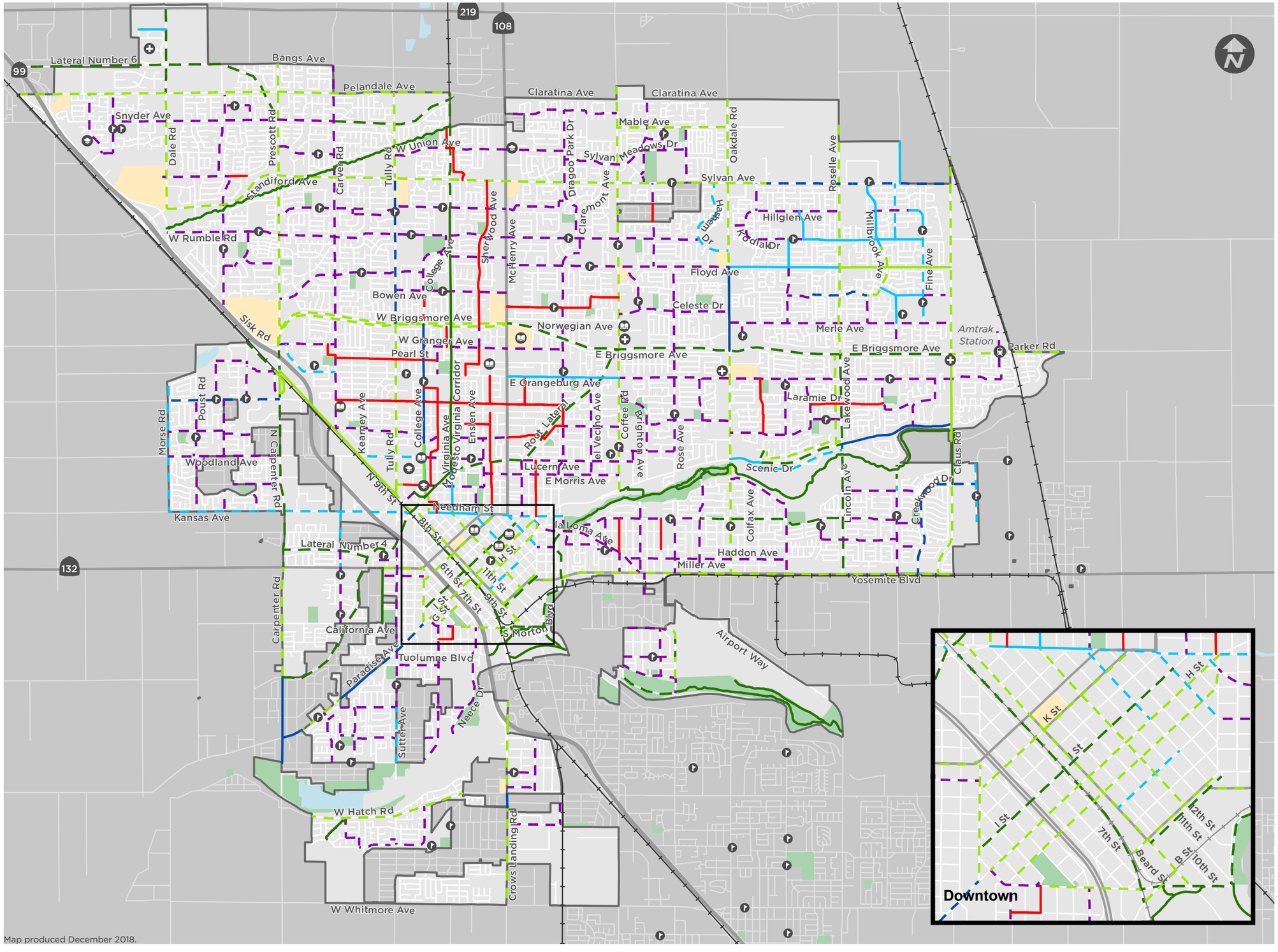
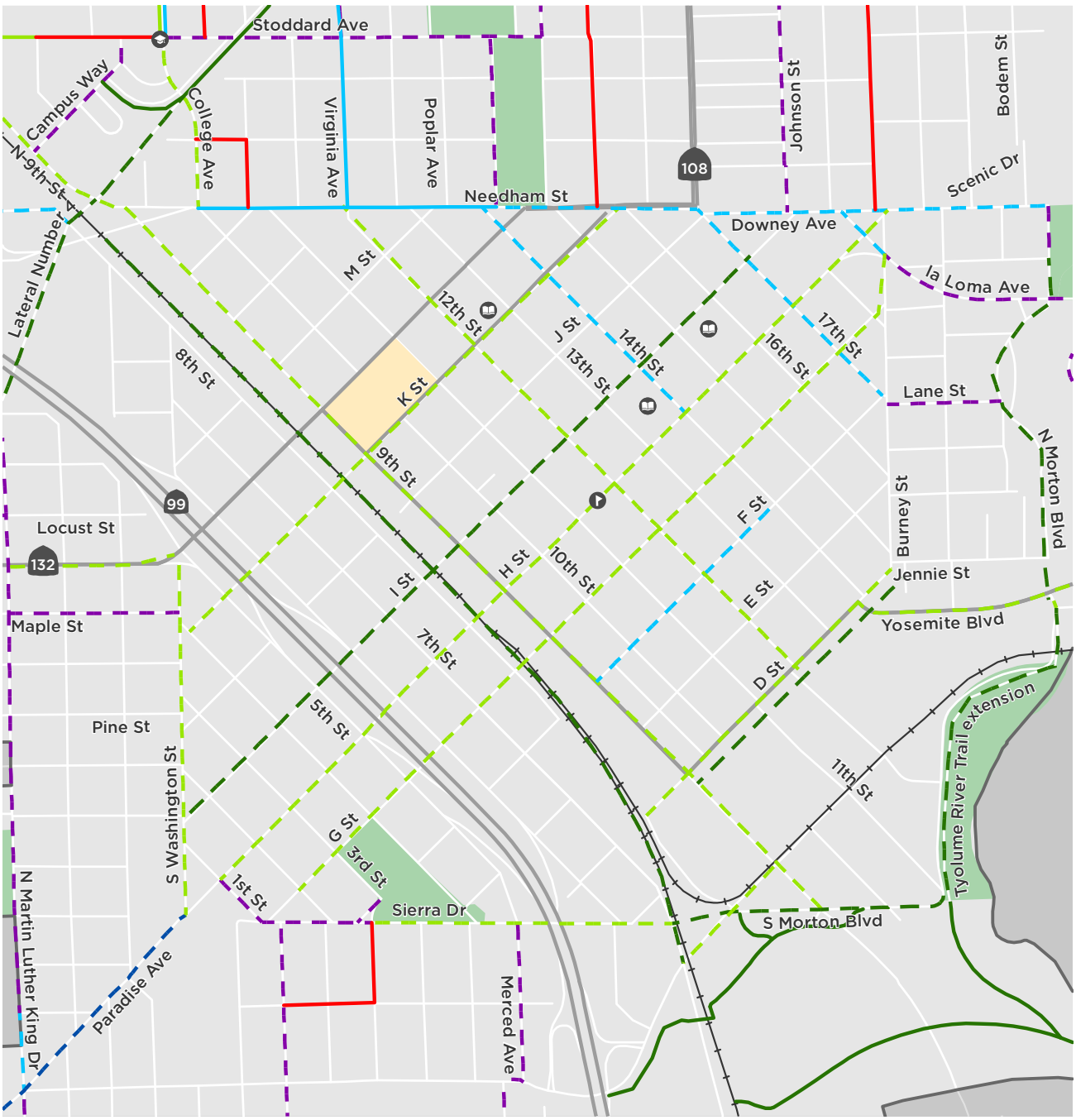


Map produced December 2018.

Figure 15a: Recommended Bikeways

Figure 15b: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.1 0.2 MILE

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Destinations + Boundai

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

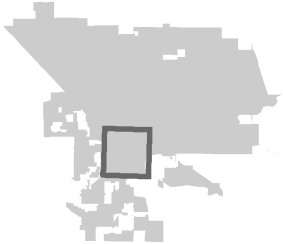


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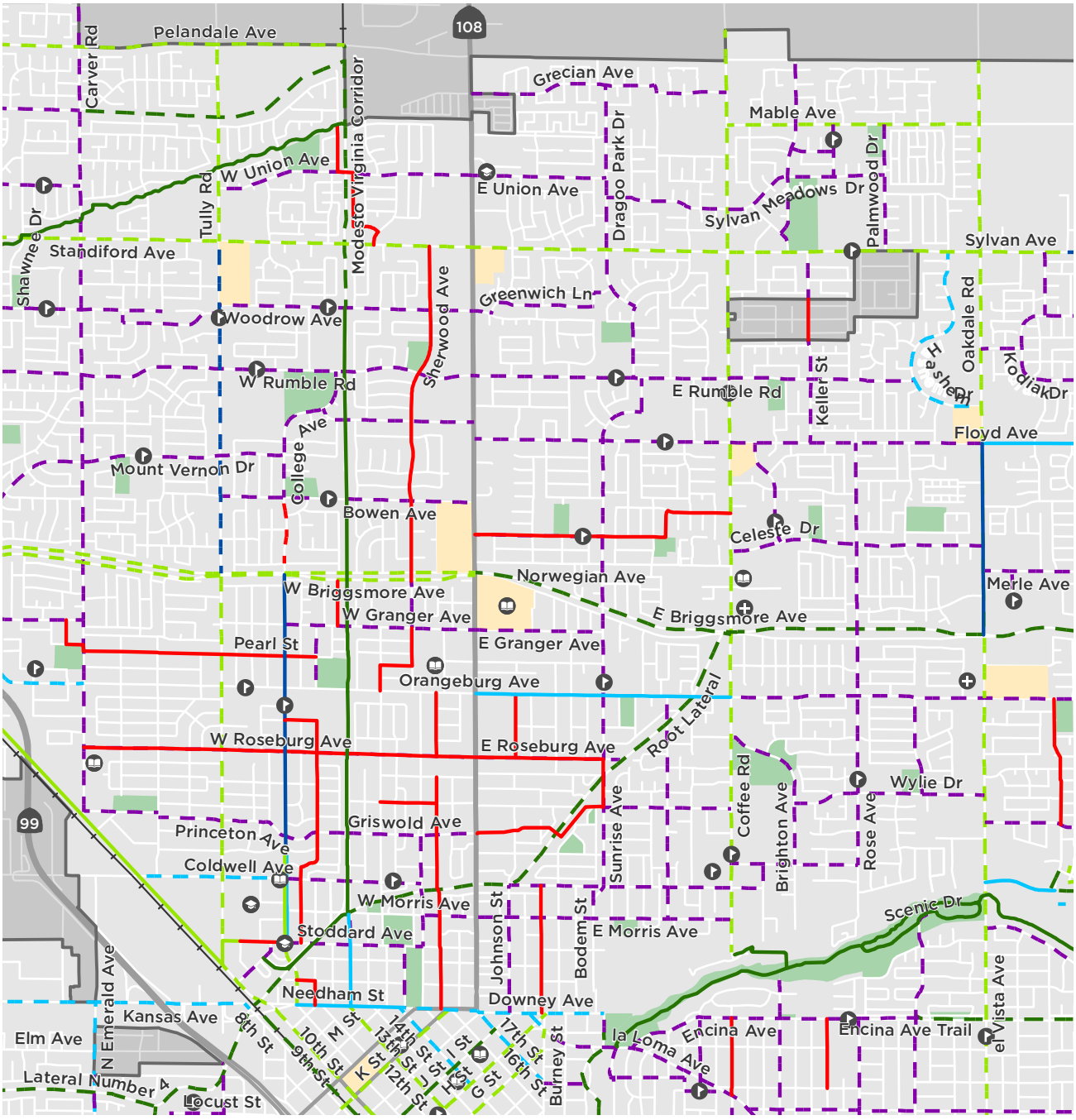
Figure 15c: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

MILE
0 0.35 0.7

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard

Destinations + Boundai

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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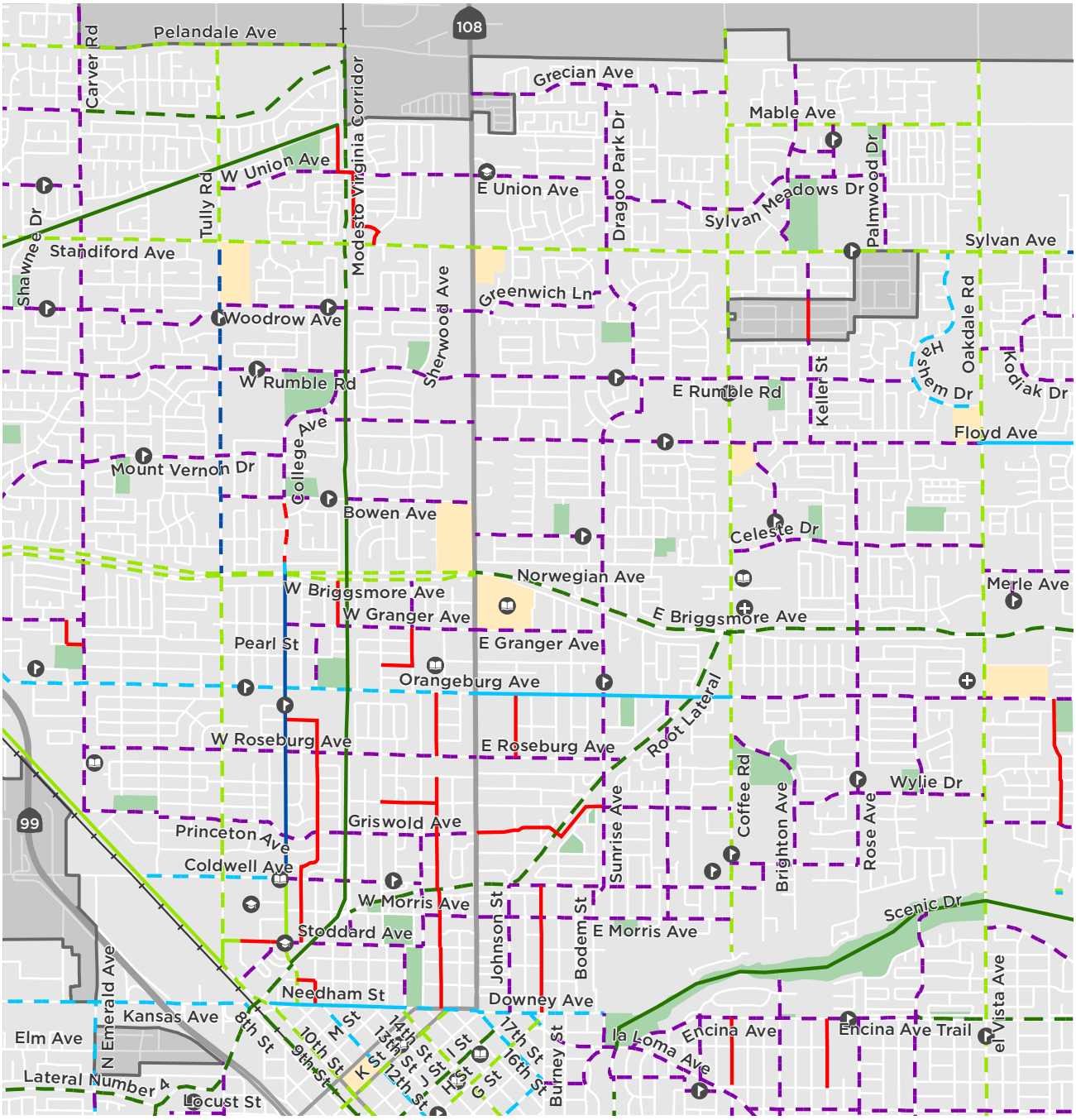
Figure 15d: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Destinations + Bounda

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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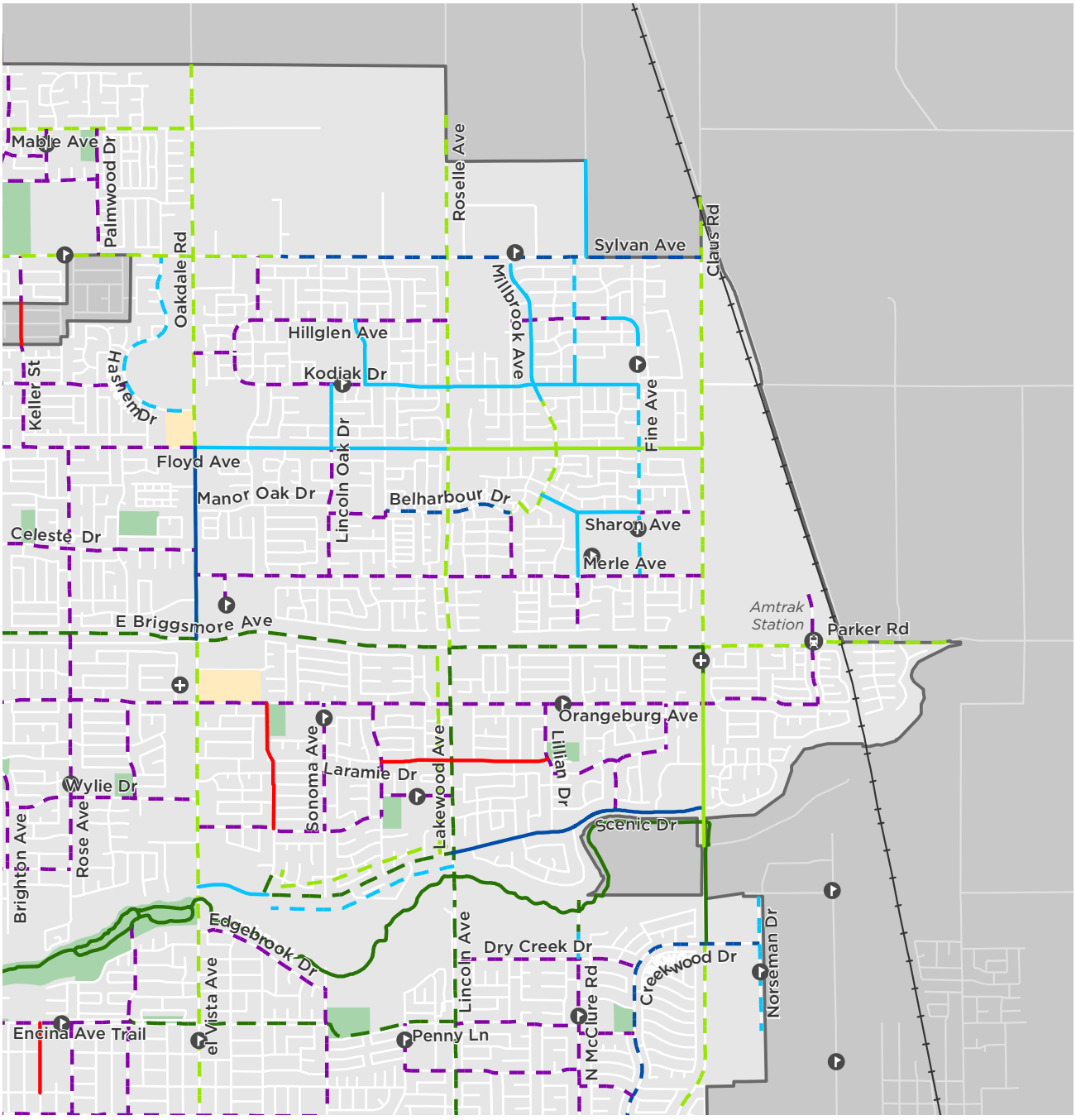
Figure 15e: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Destinations + Boundai

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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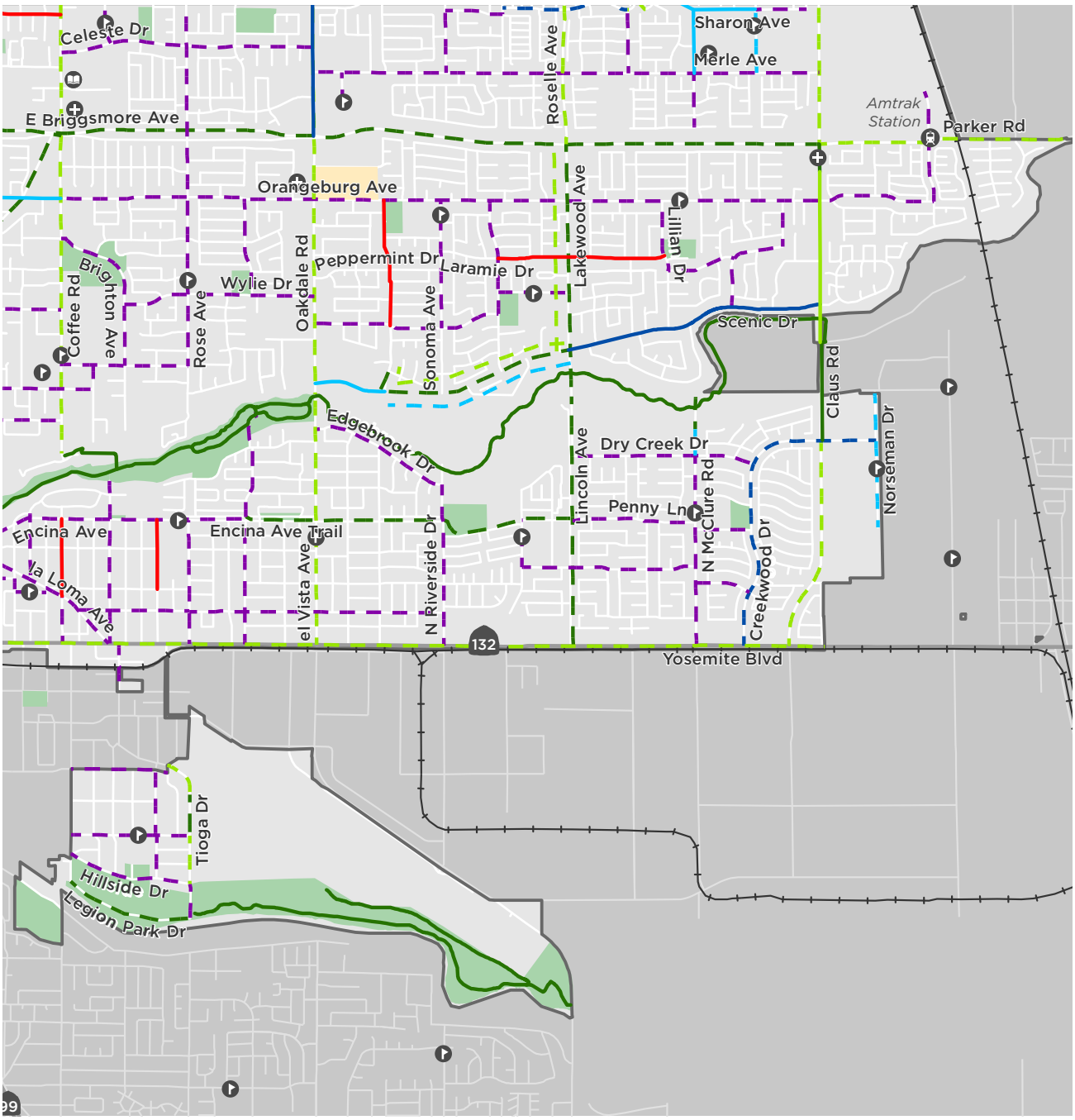
Figure 15f: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Destinations + Boundai

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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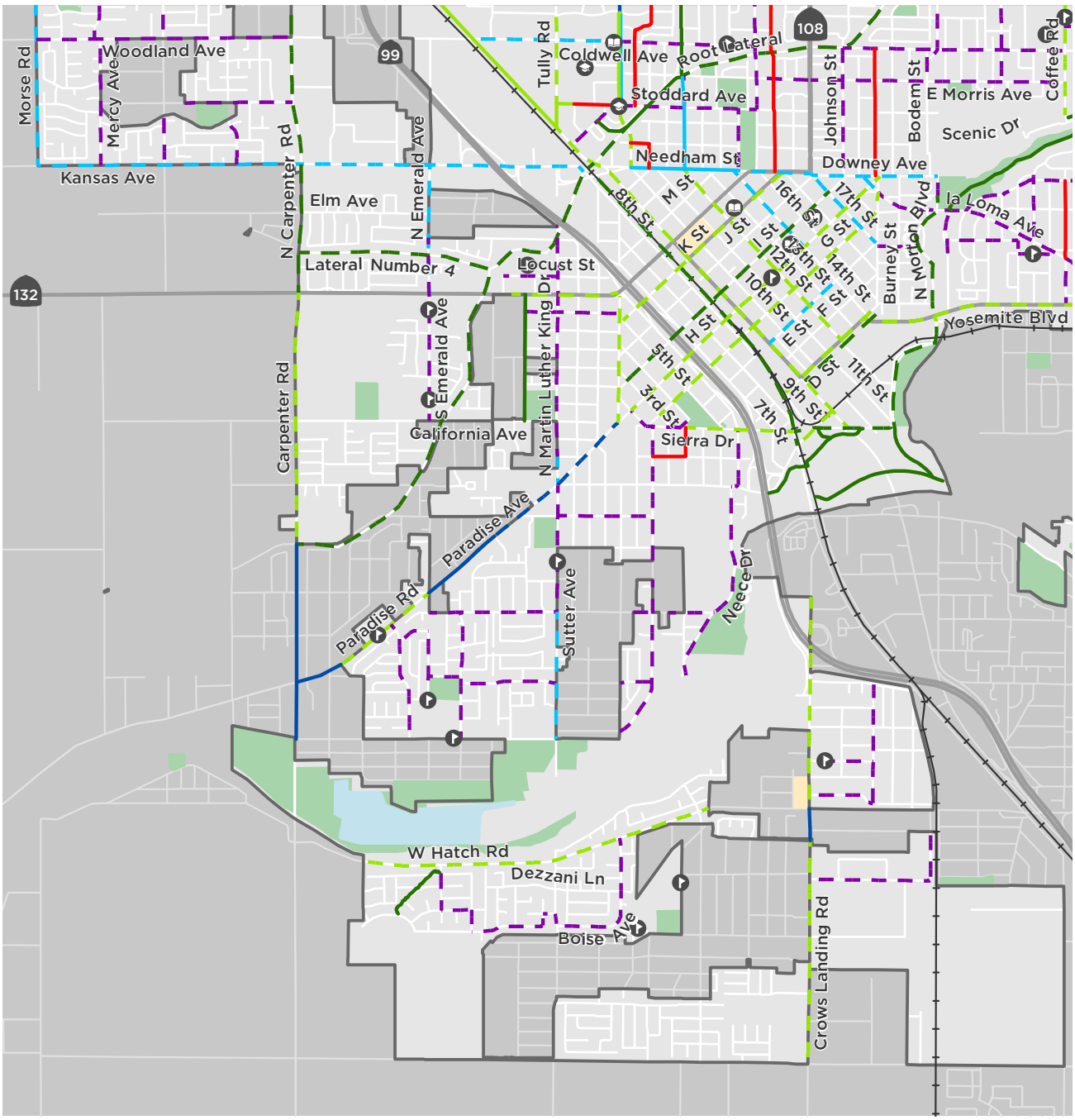
Figure 15g: Recommended Bikeways



PROPOSED BICYCLE IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Existing Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bicycle Lane
- Class III Bike Route
- Class IV Separated Bikeway

Recommended Facilities

- Class I Shared-Use Path
- Class II Bicycle Lane
- Class IIB Buffered Bike Lane
- Class III Bicycle Route
- Class IIIB Bicycle Boulevard
- Class IV Separated Bikeway

Destinations + Bounda

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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LOW-STRESS BIKEWAYS

MODESTO CA
NON-MOTORIZED
TRANSPORTATION PLAN

Proposed Bicycle Facilities

- Class I Paths and Class IV Bikeways
- Class IIIB Bicycle Boulevards

Existing Bicyle

- Class I Paths and Class IV Bikeways

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

0 0.5 1 MILE

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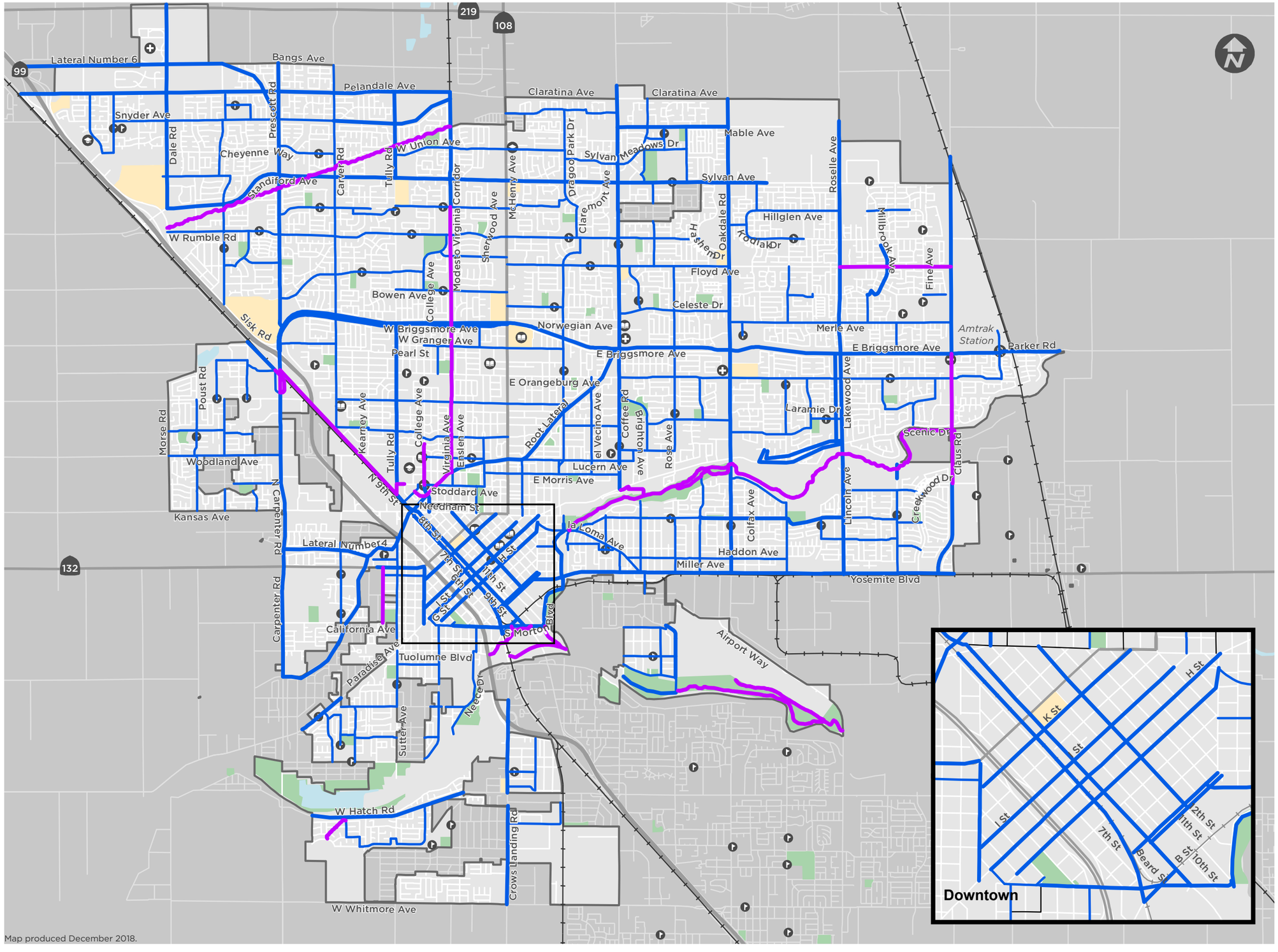


Map produced December 2018.

Figure 16: Citywide Low-Stress Bikeways

Road Diets

Road diet projects can play an essential role in the reallocation of space required to design a street that better serves bicyclists and pedestrians. A road diet is reconfiguring a roadway by removing travel lanes and utilizing the space for other uses and travel modes. The reduction of vehicle travel lanes allows the limited roadway space to be reallocated for other uses such as bike lanes, pedestrian refuge islands, transit uses, and parking.

Road diet projects require traffic pattern analysis, public engagement, and design work before determining their feasibility. However, these roadway configurations offer many high-level benefits, including enhanced safety, mobility, and access for all road users, creating a complete streets environment along each corridor. These benefits include:

- Crash reduction rates between 19%-47%
- Reduced vehicle speeds
- Improved mobility and access for all road users
- Better integration of the roadway into surrounding land uses[1]

Conflicts between high-speed through traffic, left-turning vehicles, and other road users that are more prevalent on traditional multilane streets can lead to relatively higher crash frequencies than roadways that have been reconfigured. These reconfigurations also allow cities to integrate additional pedestrian and bicycle facilities along these corridors.

Right-sizing roads with underutilized space can create a solution that addresses safety concerns and benefits for all road users. Impacts on vehicle traffic must also be considered when analyzing corridors for road diets. Vehicle traffic counts, intersection studies, and parking occupancy studies are some of the vehicle-related studies that may also be completed. These reconfigurations can also be cost-effective when combined with planned roadway reconstruction or repaving projects.

These roadway configurations offer many high-level benefits, including enhanced safety, mobility, and access for all road users.

1 Federal Highway Administration, Road Diet Informational Guide. https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/. 2014.

PEDESTRIAN RECOMMENDATIONS

Pedestrian Toolkit

This Plan's toolkit groups pedestrian infrastructure into six categories:

- Pavement markings
- Pedestrian-actuated beacons
- Street furniture
- Sidewalks, trails, and medians
- Intersection and street design
- Studies

Example infrastructure components from each of the categories are provided below.

PAVEMENT MARKINGS AND CROSSWALKS

Advance Stop and Advance Yield Markings

Advance yield pavement markings, also referred to as "Shark's teeth," are markings placed on the roadway 20'-50' before a mid-block crosswalk or crosswalk at an intersection approach without a signal or stop sign.

Stop lines are solid white lines that extend across intersection approach lanes. They may be used to indicate the point behind which vehicles are required to stop in compliance with a stop sign or other traffic control device that requires vehicles to stop, like a pedestrian hybrid beacon.

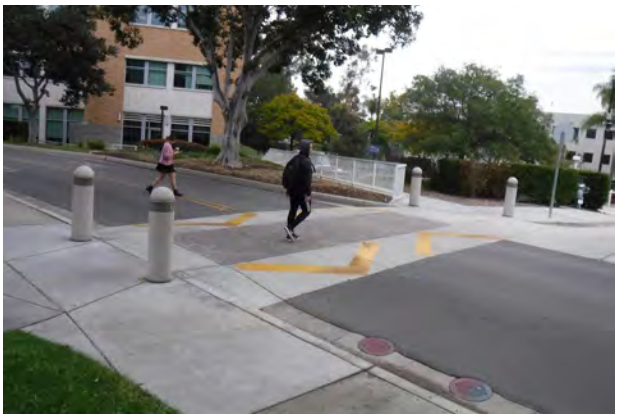
Crosswalks

Transverse crosswalks consist of two thick lines that demarcate pedestrian right-of-way at intersections and mid-block locations. High-visibility crosswalks are marked with thick bars, drawing additional attention and awareness to the crossing. There are multiple high-visibility crosswalk designs (continental ladder, etc.).

In school zones, these crosswalks are yellow, as opposed to the standard white color.

Decorative Crosswalks

Decorative crosswalks can add a placemaking element to the street while still serving a marked crosswalk's primary visibility and awareness objectives. Decorative crosswalks can be themed to reflect the surrounding neighborhood or nearby destinations. Decorative crosswalks must meet specific design parameters to remain compliant with state and federal standards; most importantly, they include transverse markings around any decorative pavement treatment.



Raised Crosswalks and Raised Intersections

A raised crosswalk is a modification of a speed table. Speed tables reduce vehicle speeds by elevating the entire wheelbase of a vehicle (unlike a speed bump that raises each axle individually). Speed tables can be designed to include a mid-block raised crosswalk; in these cases, the height of the speed table matches the sidewalk. This treatment makes pedestrians more visible to approaching motorists and also slows vehicles. Raised intersections elevate the entire intersection to the sidewalk level, providing the same improved visibility of people walking and reduction in vehicle speed as raised crosswalks, but for all intersection approaches. Raised intersections are typically applied in areas with high pedestrian usage.

Trail Markings

Paved trails can include striping to demarcate separate areas for pedestrians and bicyclists. Especially on crowded trails with high pedestrian usage, encouraging spatial separation can reduce conflicts and improve the efficiency and consistency of bicycle travel.

PEDESTRIAN-ACTUATED BEACONS

Rectangular Rapid Flashing Beacon (RRFB)

RRFBs are user-activated flashing lights used at unsignalized intersections or mid-block crossings. These beacons alert motorists to the presence of people in the crosswalk. These are most commonly used on 2-4 lane roadways.

Pedestrian Hybrid Beacon (PHB)

A pedestrian hybrid beacon is a signal designed to increase pedestrians' safety at unsignalized locations on multilane roadways. Thresholds for installation vary based on the posted speed limit, crossing distance, vehicular volumes, and volumes of pedestrian crossings.

STREET FURNITURE, UTILITIES, AND SIGNS

Signage

Signs serve a wide range of functions, from prohibiting movements, limiting parking, or providing advance notice of school zones or crosswalks.

Lighting

Pedestrian-scale lighting improves visibility for both people walking and driving, particularly at intersections. Lighting can be achieved on one light pole (one light for the road and one light for the sidewalk) or separate poles. These lights focus on illuminating the sidewalk, not the roadway. Lighting is also an important consideration along trails.

Street Furniture/Amenities

Street furniture includes benches, transit shelters, trash cans, newsstands, and other items within the public right-of-way.

Shared-Use Paths

Dedicated paths for walking and bicycling completely separate from the roadway. When paved with asphalt or concrete, trails can include markings to encourage the separation of modes.

SIDEWALKS, TRAILS, AND MEDIANS

Sidewalks

Sidewalks provide dedicated space for pedestrians to walk. Sidewalks are raised from the roadway and sometimes have a planting strip for increased separation from the street. Obstructions like utility boxes, signs, and poles can sometimes limit available sidewalk width.

Curb Extensions

Curb extensions extend the curb into the street. Curb extensions can provide several valuable traffic calming and safety benefits. They shorten the crossing distance for people walking, provide improved visibility at intersections, and provide additional pedestrian queuing space. They can be installed at intersections or mid-block. Curb extensions can be made with permanent materials like cement or implemented as a “quick build” with pavement markings and bollards/delineators.

Curb Ramps

Curb ramps allow for smooth, accessible transitions between the sidewalk and street level. Curb ramps are essential for those with special mobility needs, strollers, and many other users. Ramps must be built to current Americans with Disabilities Act standards.

Free-Right Turn Lane/Slip Lane Removal

Free-right turn lanes facilitate increased vehicle throughout and faster turns at intersections at the expense of pedestrian and bicyclist safety and movement.

INTERSECTIONS AND STREET DESIGN

Intersection Redesign

Intersections are not always symmetrical. Intersections can have confusing or asymmetric designs when more than two streets come together or when two streets come together at acute angles. There are design components like curb extensions, painted buffer areas, and medians that can make these intersections more inviting and less stressful for active transportation users.

Traffic Calming

Traffic calming is the implementation of roadway changes to slow down vehicle traffic. Engineers can consider a wide array of tools to slow vehicle traffic, including speed bumps, chicanes, speed feedback signs, and other items. Traffic calming is also an essential component of bicycle boulevards.

STUDIES

Stop Signs and Traffic Signals

Stop signs and traffic signals are traffic control devices used to regulate traffic through an intersection. Implementing stop signs and traffic signals is regulated by the California Manual on Uniform Traffic Control Devices (CA MUTCD) and requires a technical analysis before implementation.

Complex Intersections and Crossings

While most of the locations that were examined for the Plan have recommendations, some sites will require additional study and traffic analysis to develop recommendations. Some locations will also require coordination with other agencies.

Pedestrian Recommendations

The Plan recommends pedestrian infrastructure improvements at 109 locations across Modesto. Figure 17a–g shows the location of each pedestrian improvement. Table 7 provides specific details of each recommendation.

PROPOSED PEDESTRIAN FACILITIES

MODESTO CA
NON-MOTORIZED
TRANSPORTATION PLAN

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors

Trail Facilities

Recommendations

- Class I Shared-Use Path

Existing

- Class I Shared-Use Path

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

0 0.5 1 MILE

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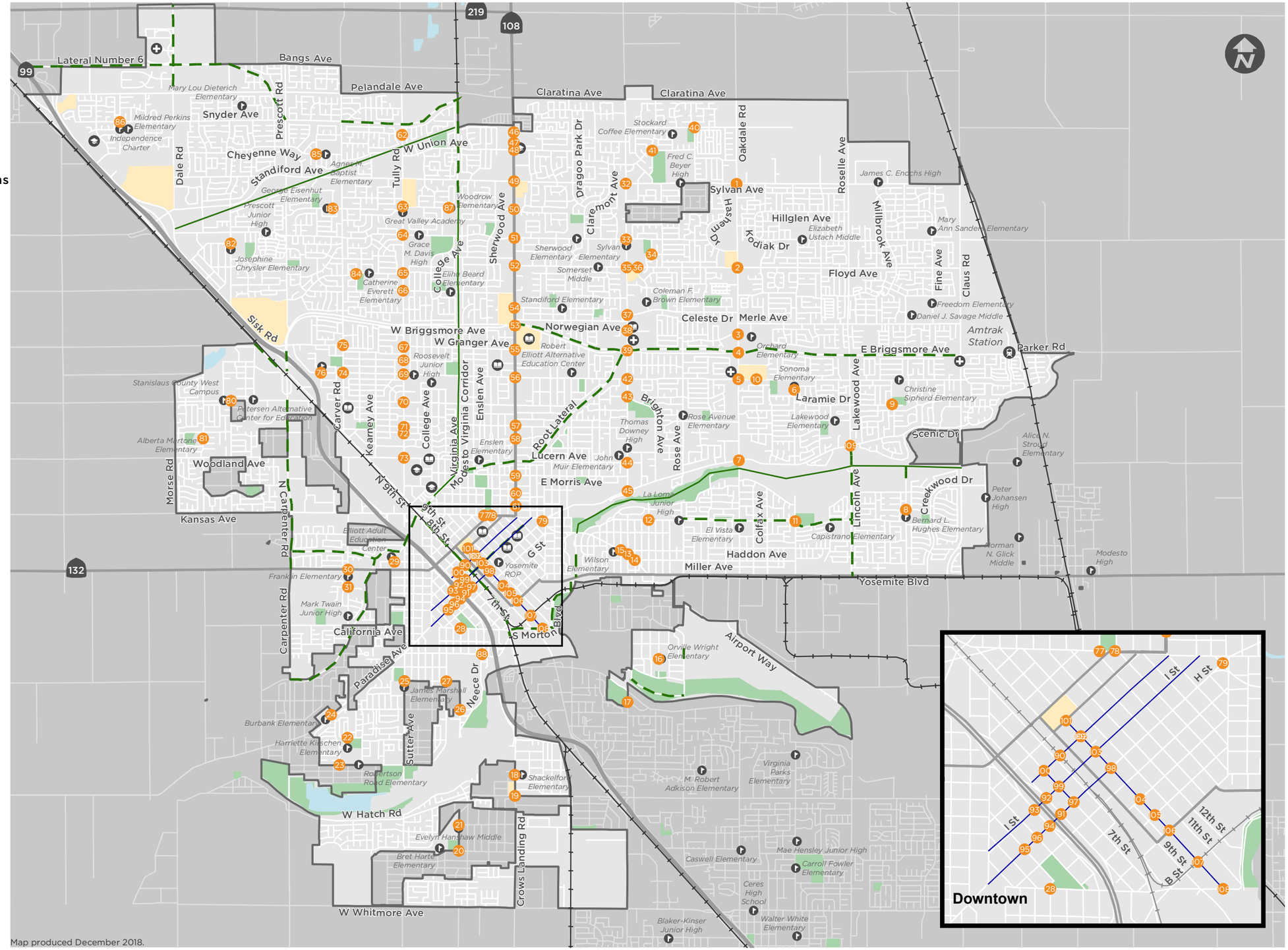
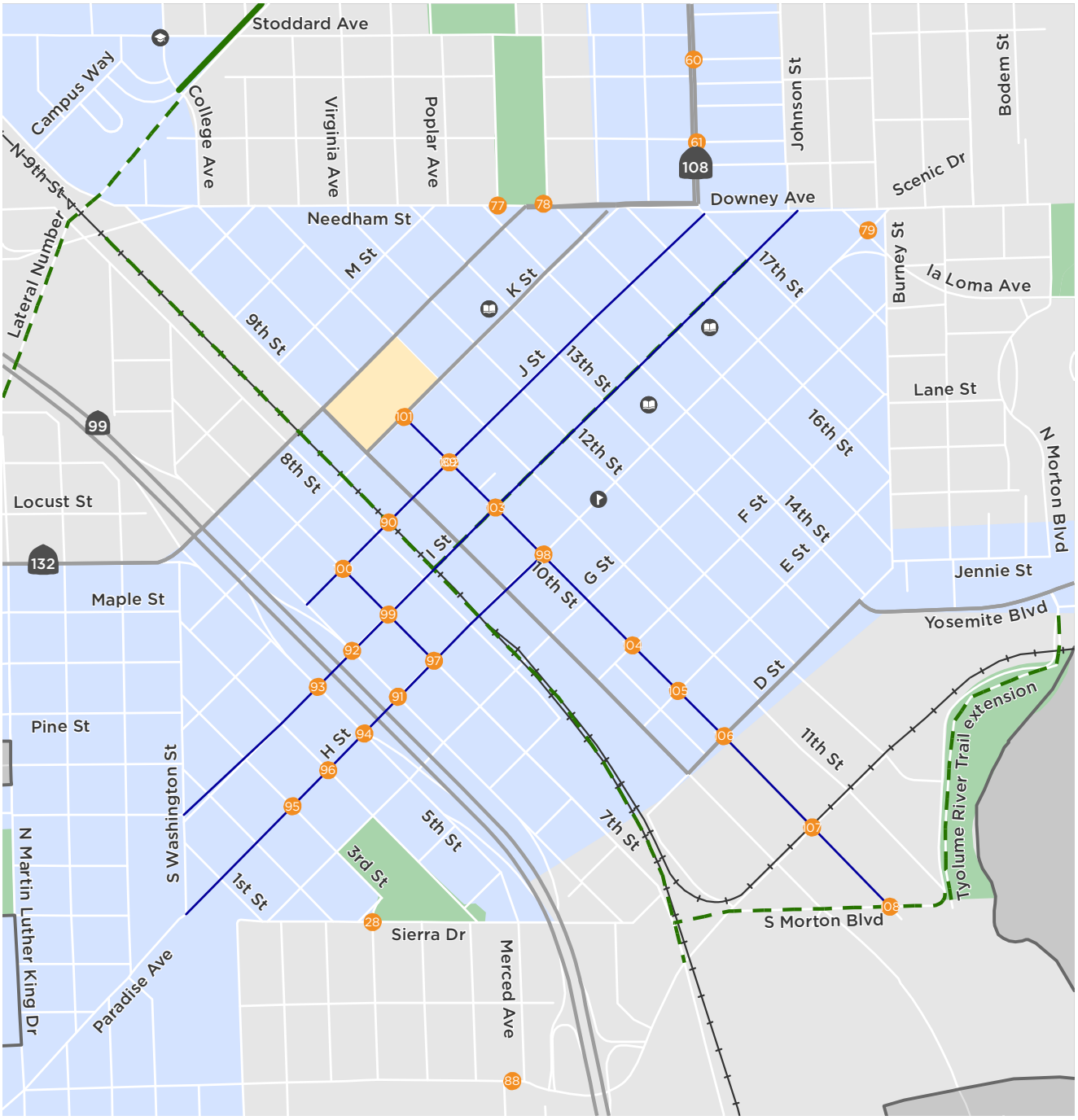


Figure 17a: Pedestrian Recommendations

Figure 17b: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.1 0.2 MILE

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

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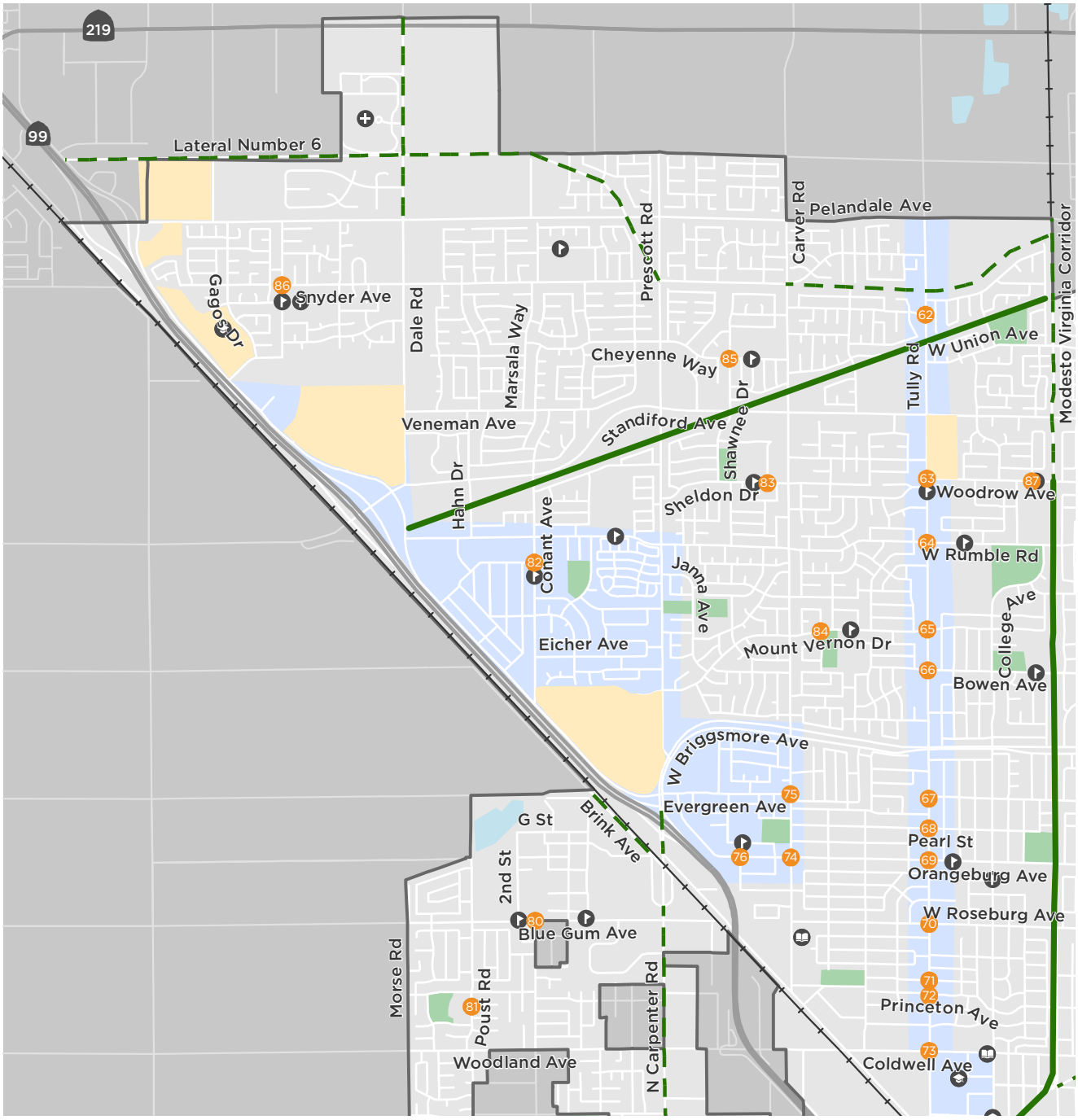
Figure 17c: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS
MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

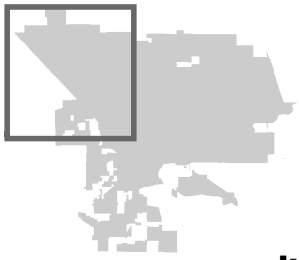


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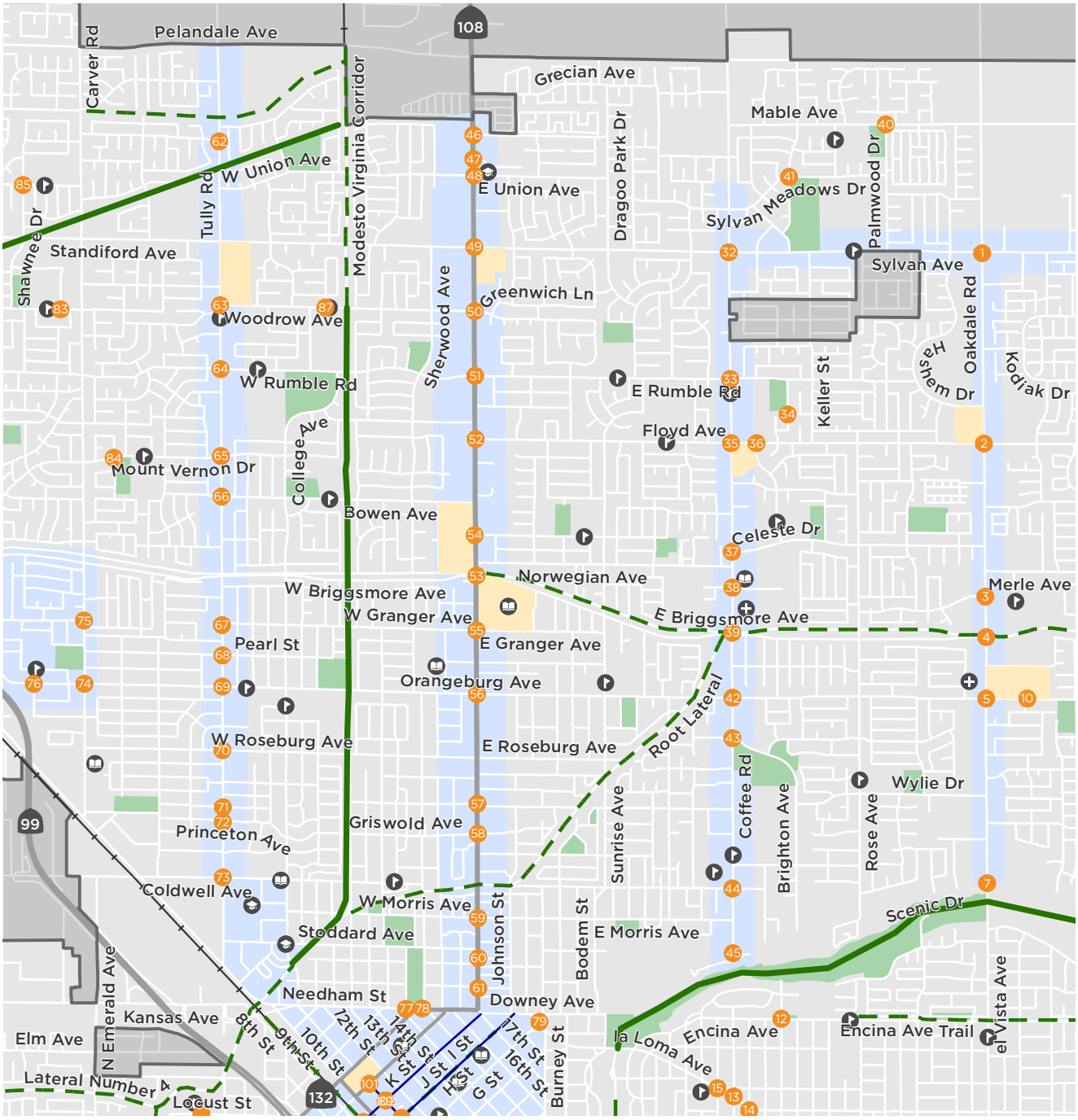
Figure 17d: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS
MODESTO NON-MOTORIZED TRANSPORTATION PLAN

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
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- School
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- Park

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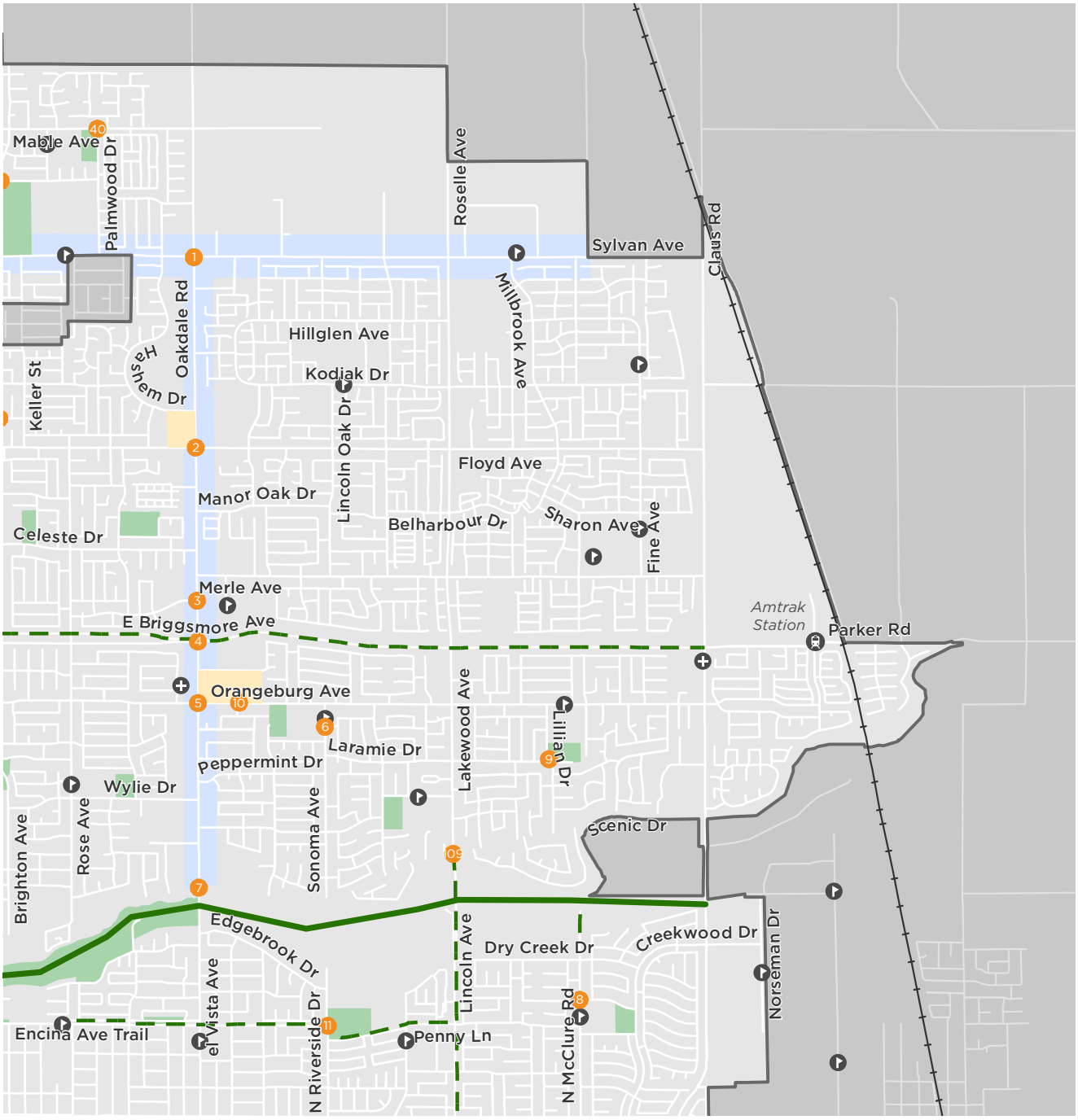
Figure 17e: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS
MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

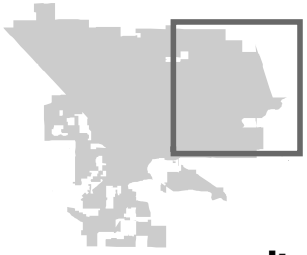


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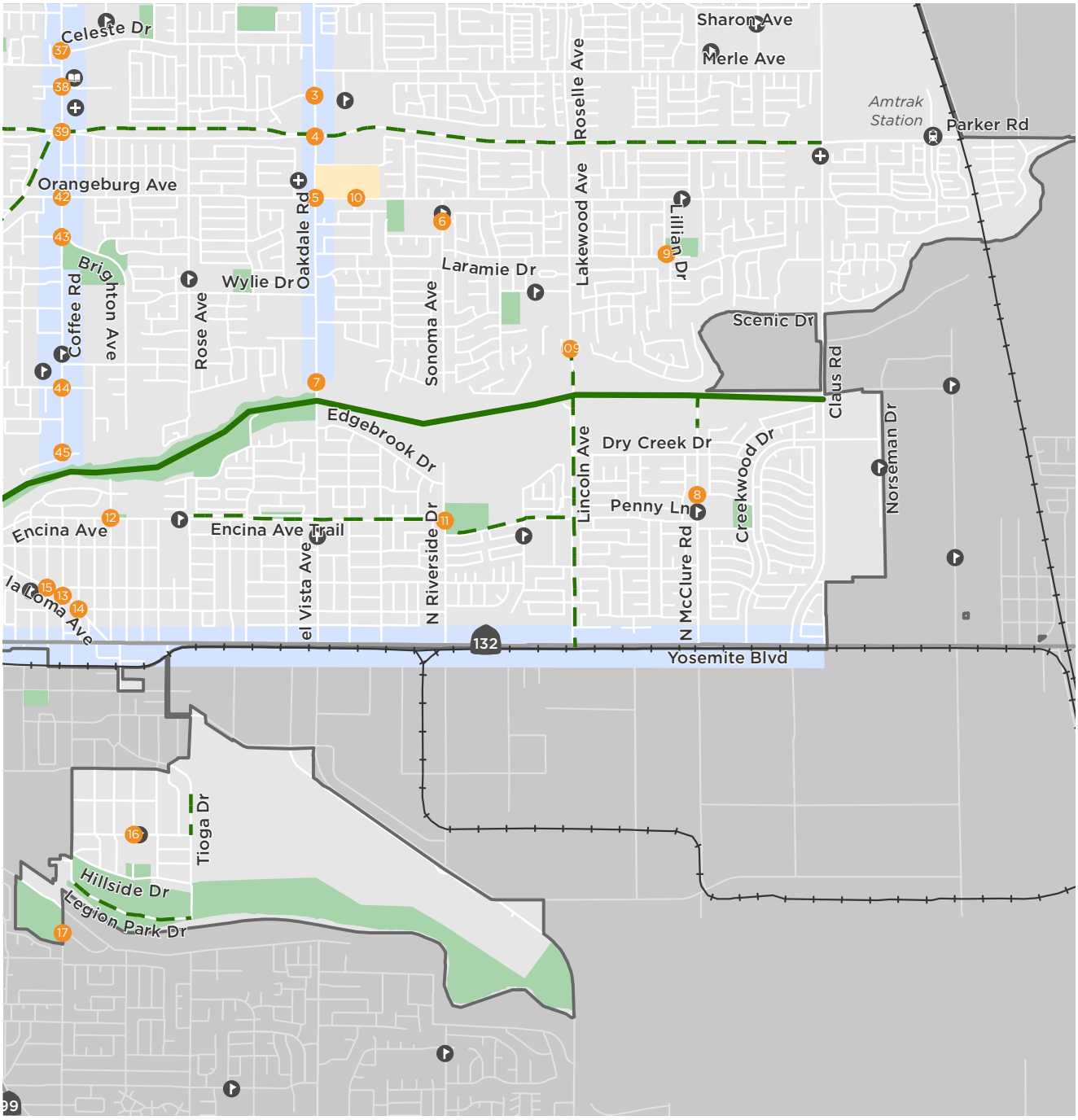
Figure 17f: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS
MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Shopping Center
- Park

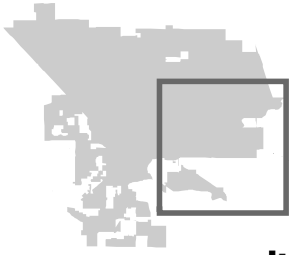


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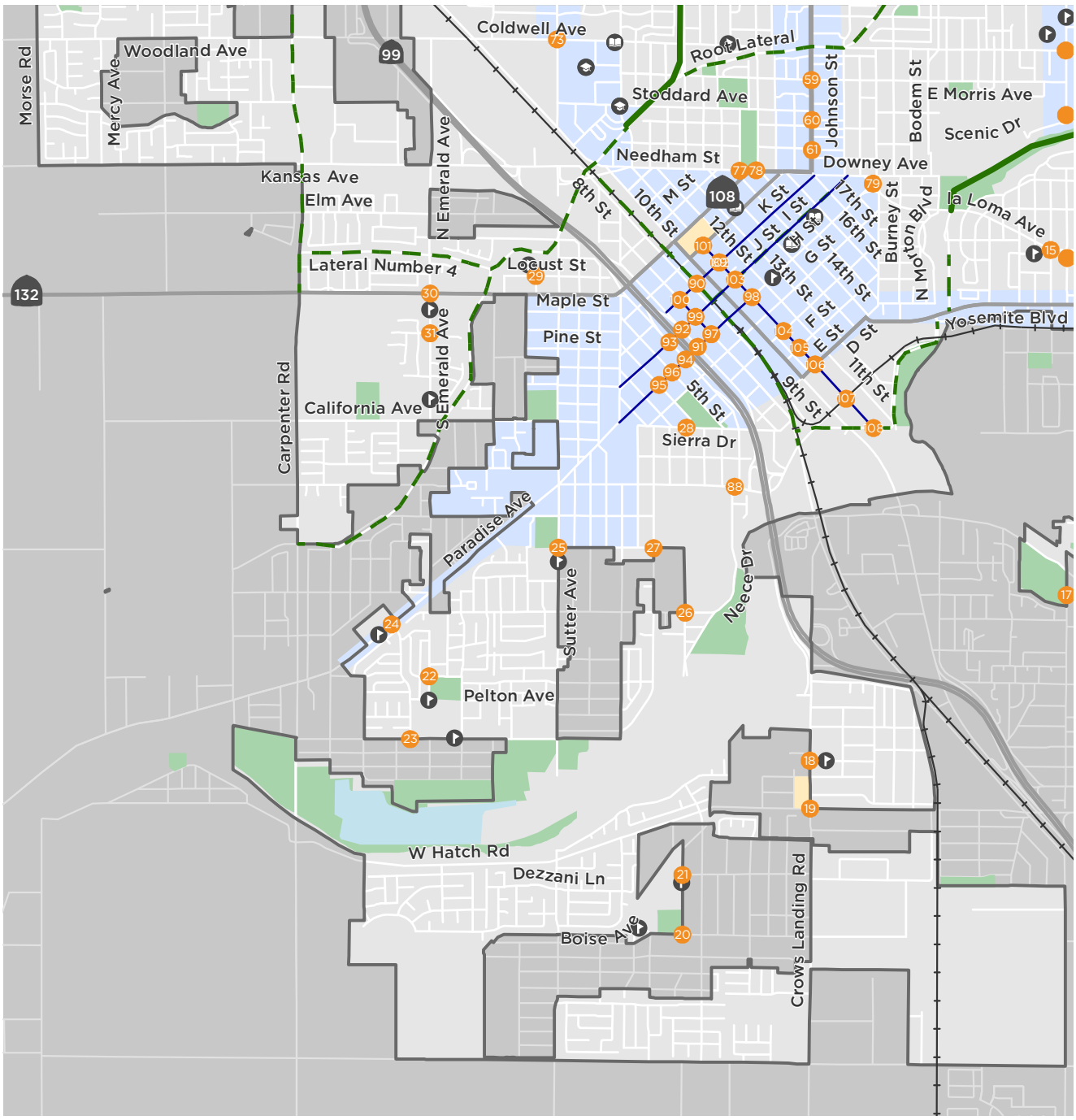
Figure 17g: Pedestrian Recommendations



PROPOSED PEDESTRIAN IMPROVEMENTS

MODESTO NON-MOTORIZED TRANSPORTATION PLAN

0 0.35 0.7 MILE

Trail Facilities

- Existing Class I Shared-Use Path
- Class I Shared-Use Path

Pedestrian Recommendations

- Improvement Location
- DT Plan Ped Corridors
- Ped Priority Area

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
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- School
- Shopping Center
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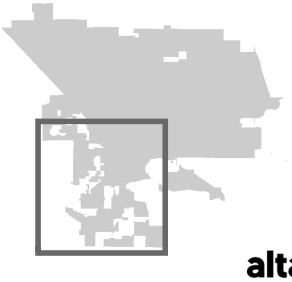

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Table 7: Pedestrian Recommendations

ID	Cross Street 1	Cross Street 2	Recommendation
1	Sylvan Ave	Oakdale Rd	Study slip lane removal at both western corners. Update all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.
2	Floyd Ave	Oakdale Rd	Upgrade all crosswalks to high-visibility crosswalks and provide a leading pedestrian interval for all crossing phases. Study removal of the slip lane at the northeast corner and realign the bike lane if removed.
3	Lancey Dr	Oakdale Rd	Refresh high-visibility crosswalks and provide a leading pedestrian interval for all crossing phases.
4	E Briggsmore Ave	Oakdale Rd	"Refresh the north high-visibility crosswalk and upgrade the other three crosswalks to high-visibility. Provide a leading pedestrian interval for all crossing phases. Refresh bicycle conflict markings. Study slip lane removal at the southwest corner.
5	E Orangeburg Ave	Oakdale Rd	Upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.
6	Sonoma Ave	Zuccaro Way	Relocate the high-visibility crosswalk across the southern approach to the northern approach for greater separation from the school driveway. If relocated, install curb extensions at both northern corners. Add additional red curb where necessary. Consider installing an RRFB for the Sonoma crossing.
7	Scenic Dr	Oakdale Rd	Upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases. Study removal of all three slip lanes. Install bicycle conflict markings.
8	Ardia Ave	N McClure Rd	Install a RRFB and advanced yield markings to support the high-visibility crosswalk across N McClure Road. Install a high-visibility crosswalk across Ardia Avenue with an advanced stop bar.
9	Lillian Dr	Laramie Dr	Install high-visibility crosswalks across Laramie Drive and on the northern crossing across Lilian Drive. Install a curb ramp at the northeast corner.
10	Hilliard Way	E Orangeburg Ave	Install a high-visibility crosswalk with advanced yield markings and an RRFB across E Orangeburg Avenue at the eastern approach. Install a transverse crosswalk across Hilliard Way

ID	Cross Street 1	Cross Street 2	Recommendation
11	Encina Ave	N Riverside Dr	Install high-visibility crosswalks with advanced stop bars at the southern and western approaches.
12	Encina Ave	Covena Ave	Install high-visibility crosswalks at all four approaches. Install advance yield markings for the Encina Avenue approaches and advance stop markings for the Covena Avenue approaches.
13	Santa Barbara Ave	La Loma Ave	Install high-visibility crosswalks with advanced stop bars across both crossing at Santa Barbara Avenue and restripe the high-visibility crosswalk across La Loma Ave with advanced yield markings. Install an RRFB for the La Loma crossing.
14	Miller Ave/La Loma Ave	N Santa Cruz Ave	Short term: Upgrade and refresh all crosswalks to high-visibility with advance stop markings. Long term: study intersection redesign options to improve visibility/sight lines, shorten crossing distances, and to square up intersection approaches.
15	Haddon Ave/La Loma Ave	N Santa Ana Ave	Upgrade all crosswalks to high-visibility and install leading pedestrian interval for all crossing phases. Consider installing a curb extension from the triangular island into Haddon Ave and through the crosswalk across La Loma Ave.
16	Monterey Ave	Thrasher Ave	Refresh all three high-visibility crosswalks and install advance stop markings. Install curb extensions at all four corners.
17	Herndon Rd	Aurora St	Install a high-visibility crosswalk across the southern approach and a transverse crosswalk across the eastern approach. Install curb extensions at both eastern corners to square up the intersection; install curb ramps.
18	Crows Landing Rd	School Ave	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.
19	Crows Landing Rd	E Hatch Rd	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.

ID	Cross Street 1	Cross Street 2	Recommendation
20	Glenn Ave	Las Vegas St	Upgrade the northern and eastern crosswalks to high-visibility and install advance stop markings. Install curb extensions at all three corners with crosswalk landings.
21	Las Vegas St	Butte Ave	Upgrade all three crosswalks to high-visibility crosswalks. Install advance yield markings for the Las Vegas Street crossings and stop markings for the Butte Avenue crossing. Construct curb extensions at both western corners.
22	Red Pine Dr	Crippen Ave	Install high-visibility crosswalks across the northern and eastern approaches with advance yield markings. Construct a curb ramp at the northwest corner.
23	Pine Tree Ln	Robertson Rd	Refresh the high-visibility crosswalk at the eastern approach with advance yield markings. Install a high-visibility crosswalk at the northern approach with advance stop markings.
24	Paradise Rd	Pine Tree Ln	Refresh the high-visibility crosswalk across Paradise Road with advance yield markings. Install a pedestrian hybrid beacon for this crossing.
25	Sutter Ave	South Ave	Refresh the high-visibility crosswalks across the northern and southern approaches with advance stop marking. Upgrade the eastern crosswalk to high-visibility with advance stop markings. Install curb extensions at all four corners.
26	Rouse Ave	Sunset Ave	Refresh the high-visibility crosswalk at the eastern approach. Install high-visibility crosswalks at the northern and southern approaches. Install advance stop markings for all approaches.
27	South Ave	Roselawn Ave	Install high-visibility crosswalks at all four approaches.
28	Sierra Dr	Sunset Blvd/3rd St	Study intersection redesign options to square up/consolidate intersection approaches (especially the northern approaches) and to determine the best location for a crossing of Sierra Drive near the community center. Upgrade the northern crosswalk to high-visibility and install advance stop markings.

ID	Cross Street 1	Cross Street 2	Recommendation
29	Locust St	Sherman Ave	Refresh the existing high-visibility crosswalk at the western approach. Install advance yield markings and consider installing an RRFB. Upgrade the crosswalk across the southern approach to high-visibility and install advance yield markings. Install curb ramps at all three corners with landings.
30	Maze Blvd	N Emerald Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility crosswalks, install advance stop markings, and provide a leading pedestrian interval for all crossing phases. Consider constructing curb extensions at all corners.
31	Sandburg Ave	S Emerald Ave	Install high-visibility crosswalks with advance yield markings across the northern and southern approaches. Refresh the transverse crosswalk across Sandburg and add advance stop markings. Consider RRFB for the Emerald Avenue crossings. Install curb ramps at all corners.
32	Coffee Rd	Sylvan Ave	Install leading pedestrian intervals for all crossing phases
33	E Rumble Rd	Coffee Rd	Install leading pedestrian intervals for all crossing phases
34	Niabell Pl	Falmouth Way	Install a high-visibility crosswalk at the northern approach (avoid driveways on the west side if possible) with advance yield markings. Install a transverse crosswalk across the eastern approach.
35	Floyd Ave	Coffee Rd	Install leading pedestrian intervals for all crossing phases
36	Floyd Ave	Vera Cruz Dr	Install high-visibility crosswalks across the western and southern approaches. Install advance yield markings and a RRFB for the western crossing. Install advance stop markings for the southern crossing.
37	Celeste Dr	Coffee Rd	Install a high-visibility crosswalk with a pedestrian hybrid beacon across the southern approach of Coffee Road. Install a curb ramp at the western landing of this crosswalk. Install advance stop markings.

ID	Cross Street 1	Cross Street 2	Recommendation
38	Spanos Ct/David Ct	Coffee Rd	Consider removing free-right turn lane at southeast corner. Build out corner to replace removed turn lane.. Upgrade all three existing crosswalks to high-visibility. Consider installing a high-visibility crosswalk at the northern approach. Install leading pedestrian intervals for all crossing phases.
39	E Briggsmore Ave	Coffee Rd	Short term: Upgrade all crosswalks to high-visibility. Long Term: Conduct traffic study to consider removing both free-right turn lanes and other intersection design/geometry improvements.
40	Palmwood Dr	Mable Ave	Install a high-visibility crosswalk across Palmwood Dr.
41	Sylvan Meadows Dr	Beyer Park Dr	Install high-visibility crosswalks across all four crossings
42	E Orangeburg Ave	Coffee Rd	Upgrade all crosswalks to high-visibility crosswalks and install advanced stop bars
43	Gloria Way/Brighton Ave	Coffee Rd	Install a high-visibility crosswalk across the southern approach of Coffee Road. Install advance stop markings. Install a pedestrian hybrid beacon across Coffee Rd.
44	Lucern Ave	Coffee Rd	Upgrade all crosswalks to high-visibility crosswalks and install advanced stop marking, and leading pedestrian intervals for all crossing phases. Study free-right turn lane removal on the southeast corner.
45	Scenic Dr	Coffee Rd	Upgrade all existing crosswalks to high-visibility and install leading pedestrian intervals for all crossing phases. Study free-right turn lane removal.
46	McHenry Ave	Coralwood Rd	Coordinate with Caltrans to install high-visibility a crosswalk across Coralwood Rd with advanced stop markings
47	McHenry Ave	Meily Way	Coordinate with Caltrans to install high-visibility a crosswalk across Meily Way with advanced stop markings
48	McHenry Ave	W Union Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars. Install leading pedestrian intervals for all crossing phases.

ID	Cross Street 1	Cross Street 2	Recommendation
49	McHenry Ave mid-block south of Sylvan Ave	Sylvan Ave/Standiford Ave	Coordinate with Caltrans to upgrade all existing crosswalks to high-visibility with advance stop markings. Provide leading pedestrian intervals for all crossing phases.
50	McHenry Ave	Woodrow Ave/Robin Hood Dr	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and provide leading pedestrian intervals for all crossing phases.
51	McHenry Ave	E Rumble Rd	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop markings and provide leading pedestrian intervals for all crossing phases.
52	McHenry Ave	Floyd Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.
53	McHenry Ave	W Briggsmore Ave	Coordinate with Caltrans to study the removal of the free-right turn lane at the southeast corner. Consider installing a bulb-out to square up the intersection if the lane is removed. Upgrade all crosswalks to high-visibility with advanced stop bars and provide leading pedestrian intervals for all
54	McHenry Ave	Tokay Ave	Coordinate with Caltrans to construct a curb extension at the northwest corner. Upgrade existing crosswalks to high-visibility and install a high-visibility crosswalk across the southern approach with advanced stop bars at all approaches. Provide leading pedestrian intervals for all crossing phases
55	McHenry Ave	Granger Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.
56	McHenry Ave	Orangeburg Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.
57	McHenry Ave	Fairmont Ave	Coordinate with Caltrans to install a pedestrian hybrid beacon across McHenry Ave and high-visibility crosswalks across both approaches to McHenry Ave on Fairmont Ave.

ID	Cross Street 1	Cross Street 2	Recommendation
58	McHenry Ave	Hintze Ave/Griswold Ave	Coordinate with Caltrans to upgrade existing crosswalks to high-visibility and install a pedestrian hybrid beacon with advanced yield markings across McHenry Ave. Consider realigning or relocating the crosswalk across McHenry Ave as a perpendicular crossing.
59	McHenry Ave	"Morris Ave"	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.
60	McHenry Ave	Almond Ave	Coordinate with Caltrans to upgrade the crosswalk across McHenry Ave to high-visibility with advanced yield markings. Install a pedestrian hybrid beacon across McHenry Ave.
61	McHenry Ave	Grant St	Coordinate with Caltrans to upgrade the crosswalk across McHenry Ave to high-visibility with advanced yield markings. Install a pedestrian hybrid beacon across McHenry Ave.
62	Trail crossing between Clevenger Dr and Union Ave	Tully Rd	At the trail crossing between Clevenger Drive and Union Avenue, refresh the high-visibility crosswalk and install advance yield markings. Install an RRFB with an additional actuation push button in the existing median.
63	Woodrow Ave	Tully Rd	Refresh the existing crosswalks to high-visibility. Install advance stop markings and provide a leading pedestrian interval for all crossing phases.
64	W Rumble Rd	Tully Rd	Upgrade the existing eastern and western crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.
65	Mount Vernon Dr	Tully Rd	Refresh all crosswalks to high-visibility crosswalks with advance stop markings. Provide a leading pedestrian interval for all crossing phases.
66	Bowen Ave	Tully Rd	Refresh all crosswalks to high-visibility crosswalks with advance stop markings. Provide a leading pedestrian interval for all crossing phases.
67	W Granger Ave	Tully Rd	Construct curb extensions at the two eastern corners and provide a leading pedestrian interval for all crossing phases.

ID	Cross Street 1	Cross Street 2	Recommendation
68	Pearl St	Tully Rd	Install high-visibility crosswalks at the eastern and western approaches. Install a pedestrian hybrid beacon for the crossing of Tully Road. Construct curb extensions at the two eastern corners.
69	W Orangeburg Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.
70	W Roseburg Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.
71	Fordham Ave	Tully Rd	Install a high-visibility crosswalk across Tully Road connecting the southwest and northeast corners with advance yield markings. Install an RRFB for the Tully crossing. Install transverse crosswalks across the eastern and western approaches.
72	Princeton Ave	Tully Rd	Construct curb extensions at all corners to square up intersection approaches. Install an RRFB for Tully Road crossing. Install transverse crosswalks for the eastern and western approaches.
73	Coldwell Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.
74	Carver Rd	Orangeburg Ave	Upgrade all crosswalks to high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases.
75	Evergreen Ave	Carver Rd	Refresh the high-visibility crosswalk at the western approach. Install a high-visibility crosswalk across the southern approach. Install a curb ramp at the southeast corner.
76	Martin Ave	Orangeburg Ave	Refresh the high-visibility crosswalk across the eastern approach and install advance yield markings. Install high-visibility crosswalks across the northern and southern approaches with advance stop markings. Consider upgrading the existing RRFB to a PHB.
77	Needham St	Park Ave/14th St/L St	Coordinate with Caltrans to study intersection redesign options to simplify intersection and improve pedestrian crossings.
78	Needham St	Sycamore Ave/15th St	Coordinate with Caltrans to study intersection redesign options to simplify intersection and improve pedestrian crossings.
79	H St/Burney St	19th St/La Loma Ave	Study intersection redesign options to simplify the intersection, reduce approaches, and improve pedestrian crossings.

ID	Cross Street 1	Cross Street 2	Recommendation
80	N Rosemore Ave	Blue Gum Ave	Refresh the high-visibility crosswalk across the western approach. Install advance stop markings. Build out the northwest corner to fill the current crosshatched area.
81	Poust Rd	Mack Ct	Extend the red curb south of the school driveway on the west side of Poust Road. Install a high-visibility crosswalk across the southern approach and curb ramp at the southwest corner. Install advance yield and "Keep Clear" pavement markings. Install a transverse crosswalk across Mack Court.
82	Brenner Way	Conant Ave	Relocate the existing high-visibility crosswalk from the southern approach to the northern approach. and install advance yield markings. Upgrade the transverse crosswalk at the western approach to high-visibility and install advance stop markings.
83	Janet Cir	Sheldon Dr	Refresh the high-visibility crosswalk across Sheldon Drive (west approach). Install advance yield markings and construct curb extensions at both corners. Refresh the transverse crosswalk across Janet Circle and install advance stop markings. Refresh the high-visibility crosswalk across Janet Drive.
84	Mount Vernon Dr	Earlmar Dr	Install high-visibility crosswalks across the northern and southern legs of the intersection.
85	Cheyenne Way	Shawnee Dr	Refresh all high-visibility crosswalks and install advance stop markings. Construct curb extensions at all four corners.
86	Blue Bird Dr	Snyder Ave	Upgrade both crosswalks to high-visibility and install advance stop markings. Install a curb ramp at the southwest corner.
87	Woodrow Ave	John Lee Ln	Install a high-visibility crosswalk across the northern approach with advance stop markings.
88	Tuolumne Blvd	Neece Dr/Merced Ave	Upgrade the crossing of Neece Dr to high-visibility. Construct a high-visibility crosswalk across the western approach of Tuolumne. Install a pedestrian hybrid beacon. Convert existing median islands to pedestrian refuge islands where appropriate.
89	J St	9th St - 11th St	From Downtown Master Plan: Create a shared or flush street from the Transit Center entrance on 9th Street till 11th Street.

ID	Cross Street 1	Cross Street 2	Recommendation
90	J Street	Railroad Tracks between 7th and 9th St	From Downtown Master Plan: Study the construction of an underpass under the railroad tracks to connect the two transit corridors.
91	6th St	H St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
92	I St	6th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
93	5th St	I St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
94	5th St	H St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
95	H St	3rd St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.
96	H St	4th St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.
97	H St	7th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
98	H St	10th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
99	I St	7th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
100	J St	7th St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.

ID	Cross Street 1	Cross Street 2	Recommendation
101	K St	10th	Consistent with the Downtown Master Plan, coordinate with Caltrans to install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.
102	J St	10th St	Consistent with the Downtown Master Plan, consider installing curb extensions at the two western corners for the crossing of J Street. Provide a leading pedestrian interval for all crossing phases.
103	I St	10th St	Consistent with the Downtown Master Plan, consider installing curb extensions at the two eastern corners for the crossing of I Street. Refresh the existing decorative crosswalks. Provide a leading pedestrian interval for all crossing phases.
104	F St	10th St	Consistent with the Downtown Master Plan, install high-visibility crosswalks across all approaches and curb extensions at all four corners.
105	10th St	E St	Install high-visibility crosswalks at all four approaches. Install advance yield markings for the 10th Street crosswalks. Consider installing RRFBs for 10th Street crossings.
106	10th St	D St	In coordination with other pedestrian improvements between D Street and B Street, upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.
107	10th St	B St	In coordination with other pedestrian improvements between D Street and B Street, install high-visibility crosswalks with advance yield markings at all four approaches. Consider installing pedestrian railroad crossing safety equipment.
108	10th St	Morton Blvd	In coordination with other pedestrian improvements between B Street and Morton Boulevard, install a high-visibility crosswalk with RRFB for a crossing of Morton Boulevard.
109	Scenic Dr	Lakewood Ave	Construct a protected intersection.

SUPPORT INFRASTRUCTURE

Wayfinding

NAVIGATIONAL ELEMENTS

The fundamental family of signs that provide bicyclists and pedestrians with navigational information consists of decision, confirmation, and turn signs, described in Table 8. Figure 18 provides typical locations of signs. Decision signs (D) are located before an intersection of two routes. Turn signs (T) are found before turns. Confirmation signs (C) are located after the turning movement and periodically along routes for reassurance.

SIGNAGE TECHNICAL GUIDANCE

A variety of standards and guidelines influence both the designs and placement of wayfinding elements in Modesto. The Manual of Traffic Control Devices (MUTCD) provides standards and guidelines for the design, size, and content of wayfinding signs. However, many jurisdictions have implemented unique signs to enhance visibility while reinforcing local identity.

BICYCLE GUIDE SIGNS

Both on-street and off-street bicycle facilities are required to follow the standards within the MUTCD. The State of California has adopted specific state standards for all traffic control devices called the CA MUTCD, which supersedes the MUTCD:

- D11-1: Bicycle Route Guide Sign
- D1-1b: Destination Supplemental Sign
- M7-1 through M7-7 Directional Arrow Supplemental Sign

The combination of standard signs with modifications allows for consistent signage throughout Modesto while branding the network.

COMMUNITY WAYFINDING

Community wayfinding signs allow for an expression of community identity, reflect local values and character, and provide more information. California has not yet adopted MUTCD community wayfinding standards, but many communities use these.

OTHER WAYFINDING ELEMENTS

In addition to the core elements, several other wayfinding elements should be considered:

Distance and time

Adding distance in familiar units can be a helpful encouragement tool for bicycling and walking. Some cities include travel time.

Street name sign blades and sign toppers

Some cities have enhanced street name sign blades to recognize bikeways and major pedestrian routes.

Pavement markings

Directional pavement markings indicate confirmation of bicycle or pedestrian presence on a designated route and indicate turn locations. Pavement markings can often be more visible and can help supplement or reinforce signage.

Table 8: Wayfinding Sign Types

Decision Sign (D)	Confirmation Sign (C)	Turn Sign (T)
▸ Clarify route options when more than one is available ▸ Typically include a system brand ▸ Up to 3 destinations ▸ Distance in time or miles (based on 10 mph or 6 minutes per mile) ▸ FHWA standard size for 3 destinations is 18" H x 30" W ▸ Municipalities can modify, often 24" W x 30" or 36" H, and place a bicycle symbol at the top ▸ Generally, 6" of vertical space per destination ▸ Sign width not standardized by the CA MUTCD	▸ Placed after turn movement or intersection to reassure that they are on the correct route ▸ Standard D11-1 series signs, system brand mark, and route or pathway name may be included ▸ The minimum size of 24" W x 18" H should be used for bike route signs, both on and off-street	▸ Clarify a specific route at changes in direction ▸ Used when only one route option is available ▸ Standard D1-1 series sign: system brand mark, route or pathway name, and/or a directional arrow may be included ▸ A minimum of 6" should be used for arrow plaque, the width may vary with destination length ▸ Standard turn arrows (M5 and M6 series) may be used to clarify movements

Figure 17: Typical Locations for Wayfinding Signs

Bicycle Parking

Bicycle parking is typically divided into short-term and long-term parking. Short-term parking is meant to accommodate bicyclists who park for up to two hours, e.g., shoppers, post office customers, and library patrons. Long-term parking, such as bike lockers, is for riders who park over two hours, e.g., employees, students, and residents. The city should coordinate with local businesses, property owners, and open space agencies to install secure bicycle parking near major destinations across the city. The installation of bike racks is subject to environmental, security, right-of-way, maintenance, and property owner factors.

BICYCLE RACKS

Bike racks provide short-term parking and should accommodate visitors, customers, and others expected to depart within two hours. Racks should follow an approved standard, with appropriate placement and weather protections. Racks should also accommodate a variety of bicycle types.

BICYCLE CORRALS

On-street bike corrals (also known as on-street bicycle parking) consist of bicycle racks grouped in a common area on the street, typically in a former car parking stall. Bicycle corrals are reserved exclusively for bicycle parking and provide a relatively inexpensive solution to providing high-capacity bicycle parking. Bicycle corrals can be implemented by converting one or two on-street motor vehicle parking spaces into on-street bicycle parking. Each motor vehicle parking space can be replaced with approximately 6-10 bicycle parking spaces.

BICYCLE LOCKERS

Bike lockers offer a secure, dedicated long-term parking area for bicycles. They typically provide a semi-enclosed space that provides a higher level of security than standard bike racks. They are usually accessible via key-card, combination lock, or key. Increased security protections enable biking to be a practical transportation option for those whose most significant concern is theft and vulnerability.

End-of-Trip Facilities

Besides providing secure bicycle parking for people biking, jurisdictions, businesses, and employers also need to provide end-of-trip facilities. End-of-trip facilities include changing rooms, clothes lockers, restrooms, and showers. These promote and facilitate active trips (especially commute trips) by making bicycling (and walking) commutes more practical. Multiple studies and references have indicated that robust end-of-trip facilities can encourage additional walking and biking commuting trips by removing obstacles for active transportation users.[1] In addition to making walking and biking more attractive, these studies also touted many workplace performance benefits from employees who used active transportation to get to work.

Green Infrastructure

There are opportunities to allow streets to function as more than just public space and mobility corridors; roads can become a vital, functional component of the natural ecosystem. Green infrastructure is a catchall term that describes sustainable stormwater management practices and infrastructure. As urban landscapes have paved and built over green space, they have disrupted hydrological cycles and have required stormwater infrastructure to manage stormwater runoff and protect water quality. Green stormwater infrastructure can reintroduce ecological functions back into the environment.

Through strategies including biofiltration planters, bioretention swales, trees, and permeable pavement surfaces, more water can return to the ground and natural systems while reducing strain on existing water systems. These stormwater strategies can be implemented in various transportation facilities, including sidewalks and trails, planted buffers, curb extensions, medians, and landscaping projects.

School Zone Speed Limits

On January 1, 2008, AB 321 took effect allowing local governments to extend school zones up to 1,000 feet and reduce speed limits within 500 feet of a school site to 15 mph in residential neighborhoods or on highways with speed limits of 30 mph or less.

At 15 mph, more than 90% of pedestrians are likely to survive a crash with only minor injuries. As speeds increase, however, crash severity increases dramatically. At 30 mph, most collisions result in severe injuries to pedestrians, and nearly half may be fatal. At 40 mph, 90% of pedestrians will be killed in a crash. Reducing speeds even slightly can have a profound effect on safety for people walking and bicycling to school.

This Plan recommends the City consider this change around eligible schools. AB 321 requires engineering and traffic surveys to indicate that the existing speed limit is not appropriate.

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2 "End-of-trip facilities for bicycle riders." Queensland Transport. Queensland Government. (2006). https://bikeleague.org/sites/default/files/BFB_Queensland_End_of_trip_facilities_for_bicycle_riders.pdf

PROGRAMS

This section describes recommended bicycle and pedestrian-related programs. The recommendations are organized in four E's:

Education programs are designed to improve safety and awareness. They can include programs that teach how to safely cross the street or teach drivers where to anticipate bicyclists and safely share the road.

Encouragement programs provide incentives and support to help people leave their car at home and try walking and biking instead.

Engagement with residents and other essential stakeholders is vital to developing community-serving programs. Continued engagement with the public is also key to the successful promotion and distribution of programming efforts.

Evaluation programs are an important component of any investment. They help measure success at meeting the goals of this Plan and identifying adjustments that may be necessary.

The fifth "E" commonly associated with active transportation is **Engineering**, which is reflected by the bicycle and pedestrian project recommendations listed earlier in this chapter.

Programs recommended on the following pages should include outreach and engagement in all languages necessary to serve all Modesto residents. Given limited staff time and available resources, programs should be implemented or continued as funding and resources allow. Partnering with local organizations and other agencies is an essential strategy to creating a sustainable program.

Education, encouragement, and evaluation programs are described below.

Education

"STREETSMARTS" CAMPAIGN

Modesto can join other California cities in implementing "StreetSmarts" media campaigns. StreetSmarts uses print media, radio, and television to educate the community about safe driving, bicycling, skateboarding, and walking behavior.

Modesto can develop messages to address current priorities that they have heard from the community, including not texting while driving or walking, how to securely lock your bicycle, the importance of being seen at night as a pedestrian or bicyclist, helping drivers understand where to anticipate bicyclists and increasing awareness of California's Three Foot Passing law.

Local students could create artwork for the updated campaign as part of a Traffic Safety Poster Contest. The posters can highlight and share information about newly completed projects, such as green transition areas and new separated bikeways. Funding could be provided by a grant from the California Office of Traffic Safety. The city can develop messaging and choose graphics with involvement from the BPAC or Citizens Advisory Group (if created), law enforcement, schools, business owners, civic leaders, and community advocates to maximize engagement and effectiveness.

BICYCLE SAFETY EDUCATION FOR ADULTS

Courses for bicycle safety are based on a curriculum from the League of American Bicyclists that focuses on how bicyclists should behave to be safer, more predictable, and more confident riding on streets both with and without dedicated bicycle facilities. The classes can also incorporate photos and video clips of local roads to help students understand how various scenarios apply to Modesto locations. The city can support by advertising the courses and providing meeting space.

Encouragement

HIRE A BICYCLE AND PEDESTRIAN COORDINATOR

This Plan recommends hiring a staff person who can work on bicycle and pedestrian projects and program coordination full time (understanding sufficient funding must be identified to create and sustain the position). This person ensures that all planning, public works, and transportation projects account for bicyclists and pedestrians. They can also write grant applications to fund projects and programs and be tasked to support all bicycle and pedestrian coordination with the public and neighboring jurisdictions.

Some organizations and foundations will fund staff member salaries, fellowships, or contractor salaries for a set period. The city may consider applying for grants from one or more of these foundations.

SOCIAL WALKS/RIDES

Supporting social walks and bicycle rides in Modesto can provide many benefits to the community. People who are uncomfortable bicycling or walking alone or unfamiliar with the best routes to use will benefit from having a group show them the way. Rides can also be used as informal education opportunities to remind participants about safe walking and bicycling behavior and sharing the road. They can also be combined with other efforts like tours of historic neighborhoods.

This Plan recommends the city partner with or support local organizations that wish to host rides or walks.

ADOPT-A-TRAIL PROGRAM

The City of Modesto may consider a voluntary Adopt-a-Trail Program to assist with the maintenance and cleanup of trails in the community. Participants commit to maintaining their adopted section of the pathway for one year, including maintaining it at least once per month. Maintenance activities performed as part of the program include litter removal and vegetation trimming, and participants are encouraged to discuss additional ideas with the Public Works Director. Path adopters are recognized on a sign on their section of trail.

BIKE RACK PROGRAM

Bike rack programs coordinate and streamline bike rack installations. Staff would work with business owners to install bike racks and corrals citywide. Where appropriate, this program could also coordinate with local businesses to provide bicycle lockers or other secure parking for employees and long-term visitors. Secure long-term parking is a crucial component of the bicycle network to encourage employees to bicycle instead of driving and helps reduce bicycle theft. Bicycle lockers should also be considered in downtown Modesto and commercial hubs to serve people shopping or running multiple errands who need a secure place to store their bicycle and deposit purchases or other items during their trip.

BICYCLE FRIENDLY BUSINESS PROGRAM

Bicycle Friendly Business programs recognize businesses that make it easy and convenient for both employees and customers to arrive by bicycle. Bicycle Friendly Businesses use different strategies to accommodate the diverse needs of customers and employees. Providing bicycle parking and supporting bicycling projects can make it more comfortable and accessible for customers and employees to travel by bicycle. Some businesses also choose to offer discounts or incentives to people who arrive by bike.

For employees, offering secure long-term parking for bicycles is key. Long-term parking could include a secure gated bicycle parking area or access to bicycle lockers. If space is not available for dedicated secure bicycle parking, business owners and landlords can consider allowing employees and tenants to bring bicycles inside and store them in their workspace or another designated location. Providing changing areas, showers, or lockers to keep belongings can also make it easier for employees to bicycle to work.

By recognizing businesses that support bicycling, Modesto can support their local economy while fostering partnerships with the Chamber of Commerce and business owners to build community support for bicycling projects and programs. The League of American Bicyclists has a Bicycle Friendly Business program, and some communities have chosen to develop their own programs.

Evaluation

ANNUAL REPORT CARD

An annual report card assesses the City's progress toward goals and objectives outlined in this Plan, its projects and programs, and shifting mode share for active transportation. Annual report cards can also incorporate a review of effectiveness to evaluate the costs and benefits of various efforts and adjust investments to maximize results.

This Plan recommends the City work with the BPAC and Citizens Advisory Group to develop an annual report card that tracks progress toward implementing this Plan. The report card should incorporate annual collision data, safe routes to school program and participation data, walking and bicycling counts, and other relevant information to highlight successes and challenges of improving walking and bicycling each year.

CHAPTER 6

Implementation

PRIORITIZATION

The following prioritization strategy reflects a systematic approach to determining each project's community benefit in a feasible, fundable, equitable, and sustainable manner. Projects will be sorted into four implementation categories based on the combined results of two evaluation processes:

1. **Community Priority**
2. **Project Feasibility**

Each evaluation process will score individual projects on specific criteria described on the following pages.

METHODOLOGY

Community Priority

The Community Priority evaluation will place projects into one of two categories, "low" or "high," based on the following metrics. Community Priority is ranked based on four criteria: enhanced safety, equity, improved connectivity, and increased accessibility. Each criterion has its own scoring metrics, worth a maximum of ten (10) points. Projects that score six (6) or more points will be rated "high," and projects that score five-and-a-half (5.5) or fewer points will be rated as "low." The criterion and scoring metrics are described below:

ENHANCED SAFETY

Ranks projects based on their likelihood of helping reduce the number/rate of future collisions at various locations. Public feedback on their perception of safety was also considered.

- Projects will score one point if located near a bicycle-involved or pedestrian-involved collision (2013-2017).
- Projects will score one point if located on a street classified as LTS 3 or 4.
  - Bikeway projects will score an additional point if the project is a Class I, Class IIIB, or Class IV recommendation.
  - Pedestrian projects will score an additional point if the project includes enhancements other than signage and striping (beacons, curb extensions, etc.).

EQUITY

Ranks projects based on their location within disadvantaged communities. This prioritization will use the CalEnviroScreen 3.0 and Free and Reduced-Price Meal analyses. The thresholds for scoring prioritization points are in line with Active Transportation Program grant metrics.

- Projects will receive one point if they are located in a census tract that ranks in the top 25 disadvantaged percentiles in the CalEnviroScreen 3.0 analysis.
- Projects will receive one half point if they are located within a quarter-mile of a school with more than 75% of students eligible for free or reduced-priced meals.

IMPROVED CONNECTIVITY

Ranks projects based on their overall effect on helping close gaps in the pedestrian and bicycle networks, strengthening network connectivity. Projects will also be rated based on enhanced connectivity over barriers, including highways and railroad tracks.

- Projects will score one (1) point if they improve connectivity across highways or railroad tracks.
- Projects will score one (1) point if they close a bicycle or pedestrian network gap.
- Projects will score one (1) point if they address connectivity to major transit stations.

INCREASED ACCESSIBILITY

Ranks proposed facilities based on their overall effect on accessibility to community destinations or enhanced accessibility at major crossings/barriers.

- Projects will score one (1) point if they improve access to essential community destinations (i.e., parks, schools, and trails).
- Pedestrian projects that include crossing enhancements near important community destinations will score one (1) additional point.
- Bikeway projects that provide new access to destinations (not upgraded facilities) will receive one additional point.

Project Feasibility

The project feasibility evaluation will categorize projects based on their complexity and costs. Generally speaking, projects that only require signage and striping changes will be considered highly feasible. Projects that require interagency coordination, require hardscape changes, or potential road diets (including parking removal) will be considered low-feasibility projects. A maximum of two points are available for project feasibility. A scoring breakdown is below:

COST

Projects that only require signage and striping (Class II, Class IIB, Class III, Class IIIB, and some pedestrian crossing improvements) will score one point.

COMPLEXITY

Projects that will not require interagency coordination (ex. Caltrans rights-of-way) will score one point.

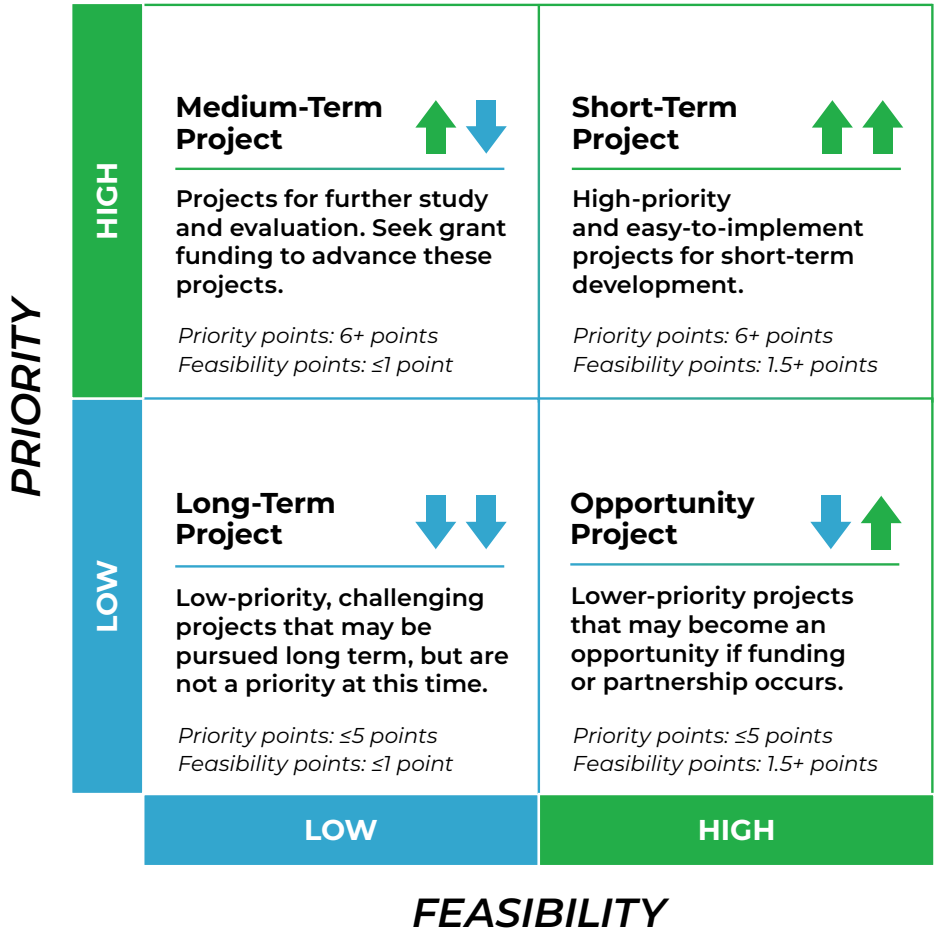
PHASED IMPLEMENTATION

Projects with a short-term implementation alternative (paint-and-post curb extension instead of concrete) will receive one half point. Only projects that score 0 points in the cost criteria are eligible for this point.

Projects that receive 1.5 or two (2) points will be considered highly feasible. Projects with one (1) or fewer points will be considered low-feasibility projects.

Projects are arranged based on their combined point total within each category. The graphic below provides further details:

- **Short-term projects** are rated high-priority and high-feasibility and represent projects that could be pursued for implementation within the first three to five years.
- **Medium-term projects** are rated high priority and low feasibility. They may require more study or analysis than short-term projects, more significant interagency coordination, or additional funding for construction.
- **Opportunity improvements** are projects rated low priority and high feasibility. They may be pursued when nearby developments or an overlapping project creates an opportunity to include these easy to implement projects.
- **Long-term projects** are rated low priority and low feasibility. They represent challenging projects or projects that may not add significant value to the walking or bicycling network on their own. Still, they are part of a long-term vision for active transportation in Modesto.



PRIORITIZATION RESULTS

Bicycle Projects

Out of a maximum of 12 possible priority points (detailed in the previous sections), the average project scored 6.2 points. No project received more than 10.5 points and the lowest score achieved was 1 point.

IMPLEMENTATION CATEGORIES

- Short Term: 30 Projects
- Medium Term: 18 Projects
- Opportunity: 49 Projects
- Long Term: 14 Projects

Table 9 shows recommended bicycle projects with their priority points and implementation category.

TOP PRIORITY BICYCLE PROJECTS

Forty-six projects scored 7 or more overall prioritization points. These 46 projects are a mix of short-term, medium-term, and opportunity projects. The prioritization process also identified 15 First Phase projects. These First Phase projects are the highest-scoring short-term projects. These First Phase projects represent the improvements that can bring the greatest community and safety benefits. First Phase projects should be among the next group of projects that Modesto implements. These 15 projects are listed below and can be seen in Figure 19:

- **1** H St (1st St - Downey Ave) - Separated Bikeway
- **2** Crows Landing Rd (City limit - E Hatch Rd) - Separated Bikeway
- **3** El Vista Ave (Yosemite Blvd - Oakdale Rd) - Separated Bikeway
- **4** Parker Rd (Claus Rd/E Briggsmore Ave - East city limit) - Separated Bikeway
- **5** W Orangeburg Ave (Carver Rd - Evergreen Ave) - Bicycle Lane
- **6** La Loma/Encina/Miller Bike Boulevard Group
- **7** Sutter/Emerald Bike Boulevard Group
- **8** Claus Rd (Yosemite Blvd - Creekwood Dr)
- **9** Paradise Ave (Beverly Dr/Harris Ave/Wade Ave - South city limit) - Separated Bikeway
- **10** I St (Washington St - 17th St) - Separated Bikeway
- **11** Carver Bike Boulevard Group
- **12** Floyd/Sunrise Bike Boulevard Group
- **13** Scenic Dr (McGuire Dr - Lakewood Ave) - Separated Bikeway or Shared-use Path
- **14** Lakewood Ave (Briggsmore Ave - Scenic Dr) - Separated Bikeway or Shared-use Path
- **15** Lakewood-Lincoln Ave Trail Bridge (Scenic Dr - Dry Creek Trail Connector/Bridge) - Shared-use Path

Table 9: Bike Priority Table

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
H St	1st St	Downey Ave	Class IV	1.34	10.5	Short-Term	Yes
Crows Landing Rd	City Limit	E Hatch Rd	Class IV	0.85	9.5	Short-Term	Yes
El Vista Ave	Yosemite Blvd	Oakdale Rd	Class IV	0.98	9.5	Short-Term	Yes
Parker Rd	Claus Rd, E Briggsmore Ave	East city limit	Class IV	0.98	9.5	Short-Term	Yes
La Loma/ Encina/ Miller Bike Boulevard Group	La Loma Ave	Encina Ave, N Santa Rosa Ave	Class IIIB	8.50	9.0	Short-Term	Yes
Sutter/ Emerald Bike Boulevard Group	Kirschen Dr	Yellow Pine Dr	Class IIIB	5.09	9.0	Short-Term	Yes
W Orangeburg Ave	Carver Rd	Evergreen Ave	Class II	0.59	9.0	Short-Term	Yes
Claus Rd	Yosemite Blvd	Creekwood Dr	Class IV	0.84	8.5	Short-Term	Yes
Paradise Ave	Beverly Dr, Harris Ave, Wade Ave	South city limit	Class IV	0.45	8.5	Short-Term	Yes
Floyd/ Sunrise Bike Boulevard Group	W Orangeburg Ave	W Granger Ave	Class IIIB	11.02	8.0	Short-Term	Yes
McClure Bike Boulevard Group	Poppypatch Dr	Penny Ln	Class IIIB	3.27	8.0	Short-Term	
Monterey/ Empire Bike Boulevard Group	Oregon Dr	Hillside Dr	Class IIIB	1.90	8.0	Short-Term	
Neece Bike Boulevard Group	Sierra Dr	3rd St	Class IIIB	3.30	8.0	Short-Term	
Orangeburg/ Rose Bike Boulevard Group	Locke Rd	Coffee Rd	Class IIIB	12.34	8.0	Short-Term	
Snyder Bike Boulevard Group			Class IIIB	6.72	8.0	Short-Term	
West Rumble Bike Boulevard Group	Park Pl	Conant Ave	Class IIIB	5.04	8.0	Short-Term	
Carver Bike Boulevard Group	McHenry Ave	Tully Rd	Class IIIB	8.68	8.0	Short-Term	Yes
I St	Washington St	17th St	Class I	1.13	8.0	Medium-Term	Yes
Morton Blvd	Rue De Yoe	Yosemite Blvd	Class I	0.54	8.0	Medium-Term	
Sutter Ave	Rouse Ave	Robertson Rd	Class II	0.50	8.0	Short-Term	
12th St	Needham St	D St	Class IV	0.93	7.5	Medium-Term	

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
9th St	S 9th St, Trail Connector, S Morton Blvd	Tully Rd	Class IV	1.66	7.5	Medium-Term	
Carpenter Rd	Maze Blvd	Chicago Ave	Class IV	0.99	7.5	Short-Term	
Claus Rd	E Briggsmore Ave	Northern city limit	Class IV	1.77	7.5	Short-Term	
Coffee Rd	Briggsmore Ave	Scenic Dr	Class IV	1.25	7.5	Short-Term	
G St	2nd St	La Loma Ave	Class IV	1.25	7.5	Medium-Term	
K St	4th St	Needham St	Class IV	0.86	7.5	Medium-Term	
Standiford Ave	McHenry Ave	Dale Rd	Class IV	3.14	7.5	Short-Term	
Sylvan Ave	McHenry Ave	Jeffrey Dr	Class IV	2.34	7.5	Short-Term	
W Briggsmore Ave	McHenry Ave	N Carpenter Rd	Class IV	2.28	7.5	Short-Term	
W Briggsmore Ave	McHenry Ave	N Carpenter Rd	Class IV	2.29	7.5	Short-Term	
Ironside/ Santa Fe Bike Boulevard Group	W Hatch Rd	Ustick Rd	Class IIIB	3.03	7.0	Opportunity Project	
Union/ E Rumble Bike Boulevard Group	Lancashire Ln	Dragoo Park Dr	Class IIIB	10.52	7.0	Opportunity Project	
West Modesto Bike Boulevard Group	G St	Blue Gum Ave	Class IIIB	5.53	7.0	Opportunity Project	
14th St	D St	Needham St	Class II	0.41	7.0	Opportunity Project	
8th St	B St	Kansas Ave	Class I	1.35	7.0	Medium-Term	
Creekwood Dr	Norseman Dr	Yosemite Blvd	Class IIB	1.25	7.0	Opportunity Project	
E Briggsmore Ave	McHenry Ave	Claus Rd	Class I	4.03	7.0	Medium-Term	
Encina Ave Trail	Phoenix Ave	Lincoln Ave	Class I	1.31	7.0	Short-Term	
Lateral Number 5	Lateral Number 4	S Carpenter Rd	Class I	1.48	7.0	Medium-Term	
N Emerald Ave	Maze Blvd	Kanas Ave	Class II	0.51	7.0	Opportunity Project	
N McClure Rd	Dry Creek Dr	N McClure Rd Connector Trail	Class II	0.11	7.0	Opportunity Project	

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
Needham St	McHenry Ave	Park Ave	Class II	0.28	7.0	Medium-Term	
Paradise Ave	S Washington St, H St	Sheridan St	Class IIB	0.66	7.0	Opportunity Project	
S Morton Blvd	N 7th St	11th St	Class I	0.40	7.0	Medium-Term	
Tully Rd	Briggsmore Ave	Standiford Ave	Class IIB	1.30	7.0	Opportunity Project	
B St	9th St	7th St	Class IV	0.19	6.5	Opportunity Project	
Coffee Rd	North city limit	Briggsmore Ave	Class IV	2.37	6.5	Opportunity Project	
Kansas Ave	8th St	Morse Rd	Class II	2.15	6.5	Opportunity Project	
Oakdale Rd	E Orangeburg Ave	Sylvan Ave	Class IV	2.51	6.5	Opportunity Project	
Oakdale Rd	El Vista Ave	E Orangeburg Ave	Class IV	0.77	6.5	Opportunity Project	
Pelandale Ave	Modesto Virginia Corridor	Salida Blvd	Class IV	3.85	6.5	Opportunity Project	
Prescott Rd	Bangs Ave	W Briggsmore Ave	Class IV	2.39	6.5	Opportunity Project	
Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class I	0.89	6.5	Short-Term	Yes
Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class IV	0.77	6.5	Short-Term	Yes
Sierra Dr	7th St, S Morton Blvd	Sunset Blvd, 3rd St	Class IV	0.43	6.5	Opportunity Project	
Tully Rd	Standiford Ave	Pelandale Ave	Class IV	0.77	6.5	Opportunity Project	
Tully Rd	Stoddard Ave	W Briggsmore Ave	Class IV	1.44	6.5	Opportunity Project	
Yosemite Blvd	D St	City Limit	Class IV	3.80	6.5	Medium-Term	
Merle Bike Boulevard Group	Merle Ave	Belharbour Dr, Millbrook Ave	Class IIIB	3.52	6.0	Opportunity Project	
Roseburg/ Princeton Bike Boulevard Group	N 9th St	Stoddard Ave	Class IIIB	5.95	6.0	Opportunity Project	
17th St	F St	Downey Ave, J St	Class II	0.36	6.0	Opportunity Project	

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
Coldwell Ave	Sycamore Ave	College Ave	Class II	0.58	6.0	Opportunity Project	
College Ave	W Briggsmore Ave	Bowen Ave	Class III	0.26	6.0	Opportunity Project	
Downey Ave	McHenry Ave	N Morton Blvd	Class II	0.50	6.0	Opportunity Project	
F St	9th St	12th St	Class II	0.36	6.0	Opportunity Project	
N Carpenter Rd	Maze Blvd	Fire Science Ln, Student Center Dr	Class I	1.57	6.0	Long-Term	
N Carpenter Rd	N 9th St	W Briggsmore Ave	Class I	0.18	6.0	Medium-Term	
Norseman Dr	South end of street	Garst Rd	Class II	0.53	6.0	Long-Term	
Scenic Dr (EB)	McGuire Dr	Lakewood Ave	Class II	0.75	6.0	Short-Term	Yes
Sylvan Ave	Jeffrey Dr	Claus Rd	Class IIB	1.65	6.0	Opportunity Project	
Crows Landing Rd	Amador Ave	W Whitmore Ave	Class IV	0.89	5.5	Opportunity Project	
D St	7th St	Burney St	Class IV	0.49	5.5	Long-Term	
Dale Rd	Standiford Ave	Pelandale Ave	Class IV	1.04	5.5	Opportunity Project	
Mable Ave	Coffee Rd	Oakdale Rd	Class IV	0.99	5.5	Opportunity Project	
Maze Blvd	Washington St	Helen White Memorial Trail	Class IV	0.42	5.5	Medium-Term	
Millbrook Ave	Sylvan Ave	Belharbour Dr, Dermond Rd	Class IV	0.60	5.5	Opportunity Project	
Roselle Ave	E Briggsmore Ave	North city limit	Class IV	2.09	5.5	Opportunity Project	
S Morton Blvd	Grand St, Toulume River Trail Extension	Yosemite Blvd	Class IV	0.02	5.5	Opportunity Project	
S Washington St	Maze Blvd	Paradise Ave	Class IV	0.50	5.5	Opportunity Project	
Tioga Dr	Monterey Ave	Hillside Dr	Class IV	0.19	5.5	Opportunity Project	
Hillglen/ Kodiak Bike Boulevard Group	La Force Dr, Kodiak Dr	Roselle Ave	Class IIIB	2.34	5.0	Opportunity Project	

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
19th St	Burney St, La Loma Ave	Downey Ave	Class II	0.09	5.0	Opportunity Project	
Blue Gum Ave	N Carpenter Rd	Morse Rd	Class IIB	1.00	5.0	Opportunity Project	
D St	7th St	Burney St	Class I	0.42	5.0	Medium-Term	
Dale Rd	Pelandale Ave	Kiernan Ave	Class I	0.79	5.0	Long-Term	
Fine Ave	Merle Ave	Hillglen Ave	Class II	0.96	5.0	Opportunity Project	
Modesto Virginia Corridor	Woodrow Ave	Pelandale Ave	Class I	1.03	5.0	Opportunity Project	
Morse Rd	Kansas Ave	Blue Gum Ave	Class II	1.00	5.0	Opportunity Project	
Root Lateral	E Briggsmore Ave, Coffee Rd	Virginia Ave, W Morris Ave	Class I	1.99	5.0	Long-Term	
Tioga Dr	S Conejo Ave	Monterey Ave	Class I	0.16	5.0	Long-Term	
College Ave	10th St, Needham St	Stoddard Ave	Class IV	0.25	4.5	Opportunity Project	
Lakewood Ave	Briggsmore Ave	Scenic Dr	Class IV	0.81	4.5	Medium-Term	Yes
W Hatch Rd	East City limit	Monticello Ln	Class IV	1.39	4.5	Opportunity Project	
Belharbour Dr	Dermond Rd	Temescal Dr	Class IIB	0.50	4.0	Opportunity Project	
Brink Ave	Student Center Dr	North city limit	Class I	0.36	4.0	Long-Term	
Hashem Dr	Carson Oak Dr, Sylvan Ave	Oakdale Rd	Class II	0.90	4.0	Opportunity Project	
Lakewood Ave	Briggsmore Ave	Scenic Dr	Class I	0.81	4.0	Medium-Term	Yes
Lakewood-Lincoln Ave Trail Bridge	Scenic Dr	Dry Creek Trail Connector/ Bridge	Class I	0.19	4.0	Medium-Term	Yes
Lateral Number 4	9th St	N Carpenter Rd	Class I	1.42	4.0	Long-Term	
Lateral Number 4	Modesto Virginia Corridor, College Ave	9th St	Class I	0.19	4.0	Long-Term	
Litt Rd	Sylvan Ave	Kodiak Dr	Class II	0.39	4.0	Opportunity Project	
N Martin Luther King Dr	Ash St	Sutter Ave, Tuolumne Blvd, Paradise Ave	Class II	0.11	4.0	Opportunity Project	

Street	To Street	From Street	Bikeway Class	Miles	Total	Priority Category	First Phase
S Morton Blvd	11th St	Grand St	Class I	0.52	4.0	Long-Term	
S Conejo Ave	Tioga Dr	Tioga Dr	Class IV	0.16	3.5	Opportunity Project	
Lateral Number 6	Sisk Rd	Prescott Rd, Snyder Ave	Class I	2.58	3.0	Long-Term	
Legion Park Dr	S Santa Cruz Ave	Tioga Dr	Class I	0.51	3.0	Long-Term	
Lincoln Ave Trail	Scenic Trail Connector	Yosemite Blvd	Class I	0.99	3.0	Short-Term	
Morse Rd	Blue Gum Ave	North end of the street	Class II	0.15	3.0	Opportunity Project	
N McClure Rd Connector	N McClure Rd	Scenic Trail	Class I	0.13	3.0	Long-Term	
Lateral Number 1	Snyder Ave	Modesto Virginia Corridor	Class I	1.12	1.0	Long-Term	

FIRST PHASE BICYCLE PROJECTS

MODESTO CA
NON-MOTORIZED
TRANSPORTATION PLAN

First Phase Projects

- Bicycle Projects

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

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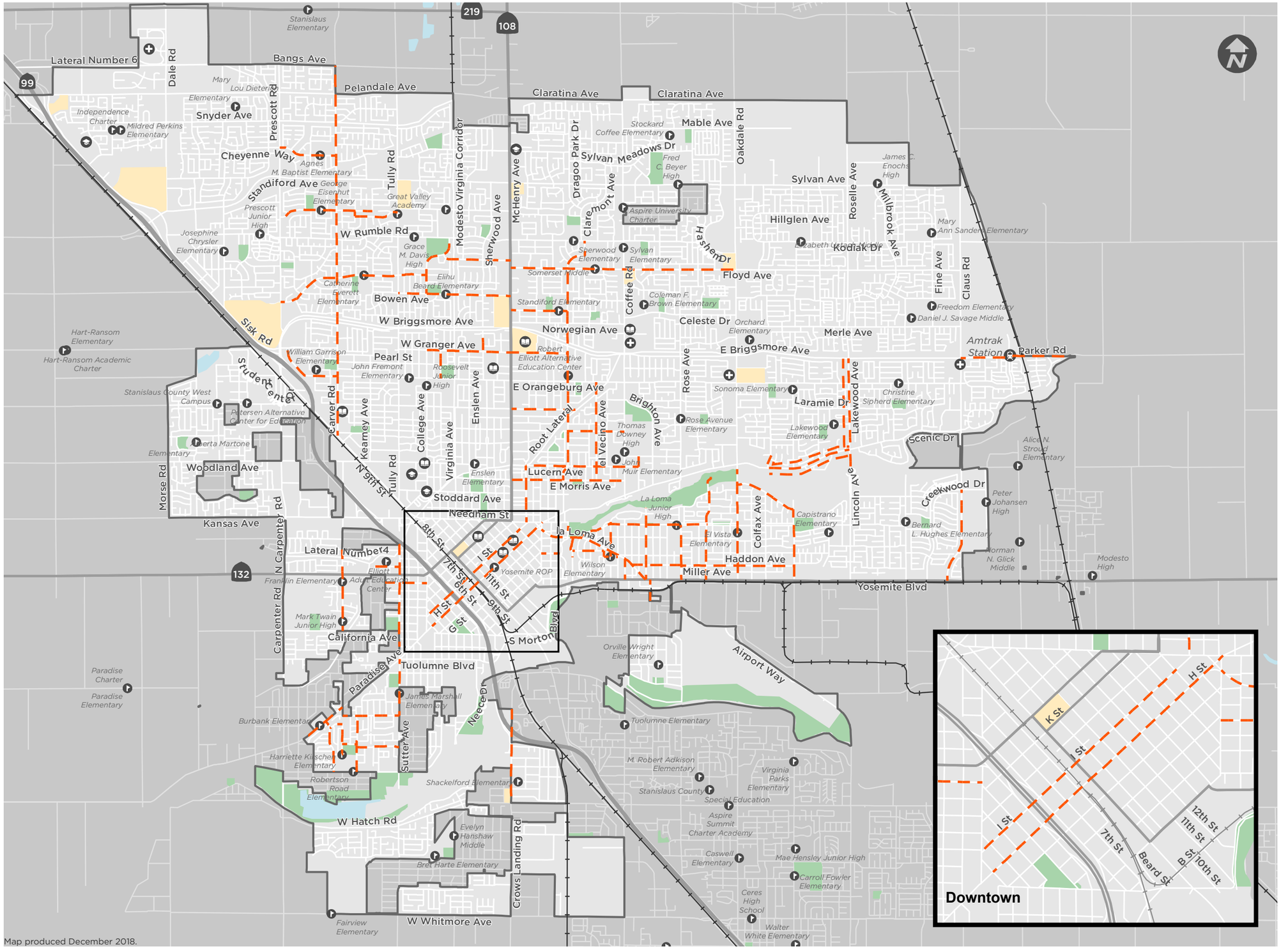

Map produced December 2018.

Figure 18: Priority Bike Facilities

Pedestrian Projects

Out of a maximum of 12 possible priority points (detailed in the previous sections), the average project scored 5.8 points. No project received more than 9 points, and the lowest score achieved was 2 points.

IMPLEMENTATION CATEGORIES

- Short Term: 12 Projects
- Medium Term: 66 Projects
- Opportunity: 14 Projects
- Long Term: 17 Projects

Table 10 shows recommended pedestrian projects with their priority points and implementation category.

TOP PRIORITY PEDESTRIAN PROJECTS

Twenty-two projects scored 7 or more overall prioritization points. The prioritization process also identified 12 First Phase projects. These First Phase projects are the highest-scoring short-term projects. These First Phase projects represent the improvements that can bring the greatest community and safety benefits. First Phase projects should be among the next group of projects that Modesto implements. These 12 projects are listed below and can be seen in Figure 20.

- **1** Santa Barbara Ave/La Loma Ave
- **2** Crows Landing Rd/School Ave
- **3** Crows Landing Rd/ E Hatch Rd
- **4** Paradise Rd/ Pine Tree Ln
- **5** Lucern Ave/Coffee Rd
- **6** W Rumble Rd/Tully Rd
- **7** Carver Rd/Orangeburg Ave
- **8** E Briggsmore Ave/Coffee Rd
- **9** Scenic Dr/Coffee Rd
- **10** W Granger Ave/Tully Rd
- **11** H St/7th St
- **12** 10th St/Morton Blvd

Table 10: Pedestrian Priority Table

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
13	Santa Barbara Ave	La Loma Ave	Install high-visibility crosswalks with advanced stop bars across both crossing at Santa Barbara Avenue and restripe the high-visibility crosswalk across La Loma Ave with advanced yield markings. Install an RRFB for the La Loma crossing.	9	Short Term	Yes

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
18	Crows Landing Rd	School Ave	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes
19	Crows Landing Rd	E Hatch Rd	Refresh all four high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes
24	Paradise Rd	Pine Tree Ln	Refresh the high-visibility crosswalk across Paradise Road with advance yield markings. Install a pedestrian hybrid beacon for this crossing.	8.5	Short Term	Yes
44	Lucern Ave	Coffee Rd	Upgrade all crosswalks to high-visibility crosswalks and install advanced stop marking, and leading pedestrian intervals for all crossing phases. Study free-right turn lane removal on the southeast corner.	8.5	Short Term	Yes
64	W Rumble Rd	Tully Rd	Upgrade the existing eastern and western crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases. Construct curb extensions at all four corners.	8.5	Short Term	Yes

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
74	Carver Rd	Orangeburg Ave	Upgrade all crosswalks to high-visibility crosswalks and install advance stop markings. Provide a leading pedestrian interval for all crossing phases.	8	Short Term	Yes
30	Maze Blvd	N Emerald Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility crosswalks, install advance stop markings, and provide a leading pedestrian interval for all crossing phases. Consider constructing curb extensions at all corners.	7.5	Opportunity Project	
39	E Briggsmore Ave	Coffee Rd	Short term: Upgrade all crosswalks to high-visibility. Long Term: Conduct traffic study to consider removing both free-right turn lanes and other intersection design/geometry improvements.	7.5	Short Term	Yes
45	Scenic Dr	Coffee Rd	Upgrade all existing crosswalks to high-visibility and install leading pedestrian intervals for all crossing phases. Study free-right turn lane removal.	7.5	Short Term	Yes
54	McHenry Ave	Tokay Ave	Coordinate with Caltrans to construct a curb extension at the northwest corner. Upgrade existing crosswalks to high-visibility and install a high-visibility crosswalk across the southern approach with advanced stop bars at all approaches. Provide leading pedestrian intervals for all crossing phases	7.5	Opportunity Project	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
67	W Granger Ave	Tully Rd	Construct curb extensions at the two eastern corners and provide a leading pedestrian interval for all crossing phases.	7.5	Short Term	Yes
97	H St	7th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	7.5	Short Term	Yes
108	10th St	Morton Blvd	In coordination with other pedestrian improvements between B Street and Morton Boulevard, install a high-visibility crosswalk with RRFB for a crossing of Morton Boulevard.	7.5	Short Term	Yes
46	McHenry Ave	Coralwood Rd	Coordinate with Caltrans to install high-visibility a crosswalk across Coralwood Rd with advanced stop markings	7	Opportunity Project	
49	McHenry Ave mid-block south of Sylvan Ave	Sylvan Ave/ Standiford Ave	Coordinate with Caltrans to upgrade all existing crosswalks to high-visibility with advance stop markings. Provide leading pedestrian intervals for all crossing phases.	7	Opportunity Project	
50	McHenry Ave	Woodrow Ave/Robin Hood Dr	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and provide leading pedestrian intervals for all crossing phases.	7	Opportunity Project	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
51	McHenry Ave	E Rumble Rd	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop markings and provide leading pedestrian intervals for all crossing phases.	7	Opportunity Project	
56	McHenry Ave	Orangeburg Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.	7	Opportunity Project	
69	W Orangeburg Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.	7	Medium Term	
73	Coldwell Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.	7	Medium Term	
90	J Street	Railroad Tracks between 7th and 9th St	From Downtown Master Plan: Study the construction of an underpass under the railroad tracks to connect the two transit corridors.	7	Opportunity Project	
14	Miller Ave/La Loma Ave	N Santa Cruz Ave	Short term: Upgrade and refresh all crosswalks to high-visibility with advance stop markings. Long term: study intersection redesign options to improve visibility/ sight lines, shorten crossing distances, and to square up intersection approaches.	6.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
15	Haddon Ave/ La Loma Ave	N Santa Ana Ave	Upgrade all crosswalks to high-visibility and install leading pedestrian interval for all crossing phases. Consider installing a curb extension from the triangular island into Haddon Ave and through the crosswalk across La Loma Ave.	6.5	Medium Term	
16	Monterey Ave	Thrasher Ave	Refresh all three high-visibility crosswalks and install advance stop markings. Install curb extensions at all four corners.	6.5	Medium Term	
25	Sutter Ave	South Ave	Refresh the high-visibility crosswalks across the northern and southern approaches with advance stop marking. Upgrade the eastern crosswalk to high-visibility with advance stop markings. Install curb extensions at all four corners.	6.5	Medium Term	
31	Sandburg Ave	S Emerald Ave	Install high-visibility crosswalks with advance yield markings across the northern and southern approaches. Refresh the transverse crosswalk across Sandburg and add advance stop markings. Consider RRFB for the Emerald Avenue crossings. Install curb ramps at all corners.	6.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
37	Celeste Dr	Coffee Rd	Install a high-visibility crosswalk with a pedestrian hybrid beacon across the southern approach of Coffee Road. Install a curb ramp at the western landing of this crosswalk. Install advance stop markings.	6.5	Medium Term	
43	Gloria Way/ Brighton Ave	Coffee Rd	Install a high-visibility crosswalk across the southern approach of Coffee Road. Install advance stop markings. Install a pedestrian hybrid beacon across Coffee Rd.	6.5	Medium Term	
53	McHenry Ave	W Briggsmore Ave	Coordinate with Caltrans to study the removal of the free-right turn lane at the southeast corner. Consider installing a bulb-out to square up the intersection if the lane is removed. Upgrade all crosswalks to high-visibility with advanced stop bars and provide leading pedestrian intervals for all	6.5	Opportunity Project	
57	McHenry Ave	Fairmont Ave	Coordinate with Caltrans to install a pedestrian hybrid beacon across McHenry Ave and high-visibility crosswalks across both approaches to McHenry Ave on Fairmont Ave.	6.5	Opportunity Project	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
58	McHenry Ave	Hintze Ave/ Griswold Ave	Coordinate with Caltrans to upgrade existing crosswalks to high-visibility and install a pedestrian hybrid beacon with advanced yield markings across McHenry Ave. Consider realigning or relocating the crosswalk across McHenry Ave as a perpendicular crossing.	6.5	Opportunity Project	
60	McHenry Ave	Almond Ave	Coordinate with Caltrans to upgrade the crosswalk across McHenry Ave to high-visibility with advanced yield markings. Install a pedestrian hybrid beacon across McHenry Ave.	6.5	Opportunity Project	
80	N Rosemore Ave	Blue Gum Ave	Refresh the high-visibility crosswalk across the western approach. Install advance stop markings. Build out the northwest corner to fill the current crosshatched area.	6.5	Medium Term	
89	J St	9th St - 11th St	From Downtown Master Plan: Create a shared or flush street from the Transit Center entrance on 9th Street till 11th Street.	6.5	Medium Term	
96	H St	4th St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.	6.5	Medium Term	
98	H St	10th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	6.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
99	I St	7th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	6.5	Medium Term	
102	J St	10th St	Consistent with the Downtown Master Plan, consider installing curb extensions at the two western corners for the crossing of J Street. Provide a leading pedestrian interval for all crossing phases.	6.5	Medium Term	
107	10th St	B St	In coordination with other pedestrian improvements between D Street and B Street, install high-visibility crosswalks with advance yield markings at all four approaches. Consider installing pedestrian railroad crossing safety equipment.	6.5	Medium Term	
109	Scenic Dr	Lakewood Ave	Construct a protected intersection.	6.5	Medium Term	
11	Encina Ave	N Riverside Dr	Install high-visibility crosswalks with advanced stop bars at the southern and western approaches.	6	Medium Term	
12	Encina Ave	Covena Ave	Install high-visibility crosswalks at all four approaches. Install advance yield markings for the Encina Avenue approaches and advance stop markings for the Covena Avenue approaches.	6	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
23	Pine Tree Ln	Robertson Rd	Refresh the high-visibility crosswalk at the eastern approach with advance yield markings. Install a high-visibility crosswalk at the northern approach with advance stop markings.	6	Medium Term	
26	Rouse Ave	Sunset Ave	Refresh the high-visibility crosswalk at the eastern approach. Install high-visibility crosswalks at the northern and southern approaches. Install advance stop markings for all approaches.	6	Medium Term	
35	Floyd Ave	Coffee Rd	Install leading pedestrian intervals for all crossing phases	6	Medium Term	
42	E Orangeburg Ave	Coffee Rd	Upgrade all crosswalks to high-visibility crosswalks and install advanced stop bars	6	Medium Term	
47	McHenry Ave	Meily Way	Coordinate with Caltrans to install high-visibility a crosswalk across Meily Way with advanced stop markings	6	Long Term	
48	McHenry Ave	W Union Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars. Install leading pedestrian intervals for all crossing phases.	6	Long Term	
52	McHenry Ave	Floyd Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.	6	Long Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
55	McHenry Ave	Granger Ave	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.	6	Long Term	
59	McHenry Ave	"Morris Ave "	Coordinate with Caltrans to upgrade all crosswalks to high-visibility with advanced stop bars and install leading pedestrian intervals for all crossing phases.	6	Long Term	
63	Woodrow Ave	Tully Rd	Refresh the existing crosswalks to high-visibility. Install advance stop markings and provide a leading pedestrian interval for all crossing phases.	6	Medium Term	
65	Mount Vernon Dr	Tully Rd	Refresh all crosswalks to high-visibility crosswalks with advance stop markings. Provide a leading pedestrian interval for all crossing phases.	6	Medium Term	
66	Bowen Ave	Tully Rd	Refresh all crosswalks to high-visibility crosswalks with advance stop markings. Provide a leading pedestrian interval for all crossing phases.	6	Medium Term	
70	W Roseburg Ave	Tully Rd	Provide a leading pedestrian interval for all crossing phases.	6	Medium Term	
77	Needham St	Park Ave/14th St/L St	Coordinate with Caltrans to study intersection redesign options to simplify intersection and improve pedestrian crossings.	6	Opportunity Project	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
78	Needham St	Sycamore Ave/15th St	Coordinate with Caltrans to study intersection redesign options to simplify intersection and improve pedestrian crossings.	6	Opportunity Project	
79	H St/Burney St	19th St/La Loma Ave	Study intersection redesign options to simplify the intersection, reduce approaches, and improve pedestrian crossings.	6	Long Term	
4	E Briggsmore Ave	Oakdale Rd	"Refresh the north high-visibility crosswalk and upgrade the other three crosswalks to high-visibility. Provide a leading pedestrian interval for all crossing phases. Refresh bicycle conflict markings. Study slip lane removal at the southwest corner.“	5.5	Medium Term	
7	Scenic Dr	Oakdale Rd	Upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases. Study removal of all three slip lanes. Install bicycle conflict markings.	5.5	Medium Term	
20	Glenn Ave	Las Vegas St	Upgrade the northern and eastern crosswalks to high-visibility and install advance stop markings. Install curb extensions at all three corners with crosswalk landings.	5.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
21	Las Vegas St	Butte Ave	Upgrade all three crosswalks to high-visibility crosswalks. Install advance yield markings for the Las Vegas Street crossings and stop markings for the Butte Avenue crossing. Construct curb extensions at both western corners.	5.5	Medium Term	
22	Red Pine Dr	Crippen Ave	Install high-visibility crosswalks across the northern and eastern approaches with advance yield markings. Construct a curb ramp at the northwest corner.	5.5	Medium Term	
28	Sierra Dr	Sunset Blvd/3rd St	Study intersection redesign options to square up/ consolidate intersection approaches (especially the northern approaches) and to determine the best location for a crossing of Sierra Drive near the community center. Upgrade the northern crosswalk to high-visibility and install advance stop markings.	5.5	Medium Term	
38	Spanos Ct/ David Ct	Coffee Rd	Consider removing free-right turn lane at southeast corner. Build out corner to replace removed turn lane. Upgrade all three existing crosswalks to high-visibility. Consider installing a high-visibility crosswalk at the northern approach. Install leading pedestrian intervals for all crossing phases.	5.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
61	McHenry Ave	Grant St	Coordinate with Caltrans to upgrade the crosswalk across McHenry Ave to high-visibility with advanced yield markings. Install a pedestrian hybrid beacon across McHenry Ave.	5.5	Long Term	
68	Pearl St	Tully Rd	Install high-visibility crosswalks at the eastern and western approaches. Install a pedestrian hybrid beacon for the crossing of Tully Road. Construct curb extensions at the two eastern corners.	5.5	Medium Term	
71	Fordham Ave	Tully Rd	Install a high-visibility crosswalk across Tully Road connecting the southwest and northeast corners with advance yield markings. Install an RRFB for the Tully crossing. Install transverse crosswalks across the eastern and western approaches.	5.5	Medium Term	
88	Tuolumne Blvd	Neece Dr/ Merced Ave	Upgrade the crossing of Neece Dr to high-visibility. Construct a high-visibility crosswalk across the western approach of Tuolumne. Install a pedestrian hybrid beacon. Convert existing median islands to pedestrian refuge islands where appropriate.	5.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
92	I St	6th St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	5.5	Long Term	
93	5th St	I St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	5.5	Long Term	
94	5th St	H St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	5.5	Long Term	
95	H St	3rd St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.	5.5	Medium Term	
100	J St	7th St	Consistent with the Downtown Master Plan, install curb extensions and upgrade all crosswalks to high-visibility crosswalks.	5.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
101	K St	10th	Consistent with the Downtown Master Plan, coordinate with Caltrans to install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	5.5	Long Term	
103	I St	10th St	Consistent with the Downtown Master Plan, consider installing curb extensions at the two eastern corners for the crossing of I Street. Refresh the existing decorative crosswalks. Provide a leading pedestrian interval for all crossing phases.	5.5	Medium Term	
104	F St	10th St	Consistent with the Downtown Master Plan, install high-visibility crosswalks across all approaches and curb extensions at all four corners.	5.5	Medium Term	
5	E Orangeburg Ave	Oakdale Rd	Upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.	5	Medium Term	
8	Ardia Ave	N McClure Rd	Install a RRFB and advanced yield markings to support the high-visibility crosswalk across N McClure Road. Install a high-visibility crosswalk across Ardia Avenue with an advanced stop bar.	5	Medium Term	
32	Coffee Rd	Sylvan Ave	Install leading pedestrian intervals for all crossing phases	5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
33	E Rumble Rd	Coffee Rd	Install leading pedestrian intervals for all crossing phases	5	Medium Term	
36	Floyd Ave	Vera Cruz Dr	Install high-visibility crosswalks across the western and southern approaches. Install advance yield markings and a RRFB for the western crossing. Install advance stop markings for the southern crossing.	5	Medium Term	
62	Trail crossing between Clevenger Dr and Union Ave	Tully Rd	At the trail crossing between Clevenger Drive and Union Avenue, refresh the high-visibility crosswalk and install advance yield markings. Install an RRFB with an additional actuation push button in the existing median.	5	Medium Term	
75	Evergreen Ave	Carver Rd	Refresh the high-visibility crosswalk at the western approach. Install a high-visibility crosswalk across the southern approach. Install a curb ramp at the southeast corner.	5	Medium Term	
81	Poust Rd	Mack Ct	Extend the red curb south of the school driveway on the west side of Poust Road. Install a high-visibility crosswalk across the southern approach and curb ramp at the southwest corner. Install advance yield and "Keep Clear" pavement markings. Install a transverse crosswalk across Mack Court.	5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
82	Brenner Way	Conant Ave	Relocate the existing high-visibility crosswalk from the southern approach to the northern approach. and install advance yield markings. Upgrade the transverse crosswalk at the western approach to high-visibility and install advance stop markings.	5	Medium Term	
87	Woodrow Ave	John Lee Ln	Install a high-visibility crosswalk across the northern approach with advance stop markings.	5	Medium Term	
106	10th St	D St	In coordination with other pedestrian improvements between D Street and B Street, upgrade all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.	5	Long Term	
17	Herndon Rd	Aurora St	Install a high-visibility crosswalk across the southern approach and a transverse crosswalk across the eastern approach. Install curb extensions at both eastern corners to square up the intersection; install curb ramps.	4.5	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
29	Locust St	Sherman Ave	Refresh the existing high-visibility crosswalk at the western approach. Install advance yield markings and consider installing an RRFB. Upgrade the crosswalk across the southern approach to high-visibility and install advance yield markings. Install curb ramps at all three corners with landings.	4.5	Medium Term	
72	Princeton Ave	Tully Rd	Construct curb extensions at all corners to square up intersection approaches. Install an RRFB for Tully Road crossing. Install transverse crosswalks for the eastern and western approaches.	4.5	Medium Term	
83	Janet Cir	Sheldon Dr	Refresh the high-visibility crosswalk across Sheldon Drive (west approach). Install advance yield markings and construct curb extensions at both corners. Refresh the transverse crosswalk across Janet Circle and install advance stop markings. Refresh the high-visibility crosswalk across Janet Drive.	4.5	Medium Term	
91	6th St	H St	Consistent with the Downtown Master Plan, install curb extensions, upgrade all crosswalks to high-visibility crosswalks, and provide leading pedestrian intervals for all crossing phases.	4.5	Long Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
105	10th St	E St	Install high-visibility crosswalks at all four approaches. Install advance yield markings for the 10th Street crosswalks. Consider installing RRFBs for 10th Street crossings.	4.5	Medium Term	
10	Hilliard Way	E Orangeburg Ave	Install a high-visibility crosswalk with advanced yield markings and an RRFB across E Orangeburg Avenue at the eastern approach. Install a transverse crosswalk across Hiliard Way	4	Medium Term	
27	South Ave	Roselawn Ave	Install high-visibility crosswalks at all four approaches.	4	Medium Term	
40	Palmwood Dr	Mable Ave	Install a high-visibility crosswalk across Palmwood Dr.	4	Medium Term	
76	Martin Ave	Orangeburg Ave	Refresh the high-visibility crosswalk across the eastern approach and install advance yield markings. Install high-visibility crosswalks across the northern and southern approaches with advance stop markings. Consider upgrading the existing RRFB to a PHB.	4	Long Term	
86	Blue Bird Dr	Snyder Ave	Upgrade both crosswalks to high-visibility and install advance stop markings. Install a curb ramp at the southwest corner.	4	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
6	Sonoma Ave	Zuccaro Way	Relocate the high-visibility crosswalk across the southern approach to the northern approach for greater separation from the school driveway. If relocated, install curb extensions at both northern corners. Add additional red curb where necessary. Consider installing an RRFB for the Sonoma crossing.	3.5	Medium Term	
85	Cheyenne Way	Shawnee Dr	Refresh all high-visibility crosswalks and install advance stop markings. Construct curb extensions at all four corners.	3.5	Medium Term	
9	Lillian Dr	Laramie Dr	Install high-visibility crosswalks across Laranie Drive and on the northern crossing across Lilian Drive. Install a curb ramp at the northeast corner.	3	Medium Term	
34	Niabell Pl	Falmouth Way	Install a high-visibility crosswalk at the northern approach (avoid driveways on the west side if possible) with advance yield markings. Install a transverse crosswalk across the eastern approach.	3	Medium Term	
41	Sylvan Meadows Dr	Beyer Park Dr	Install high-visibility crosswalks across all four crossings	3	Medium Term	
84	Mount Vernon Dr	Earlmar Dr	Install high-visibility crosswalks across the northern and southern legs of the intersection.	3	Medium Term	

ID	Cross Street 1	Cross Street 2	Recommendation	Total	Category	Priority
1	Sylvan Ave	Oakdale Rd	Study slip lane removal at both western corners. Update all crosswalks to high-visibility and provide a leading pedestrian interval for all crossing phases.	2	Long Term	
2	Floyd Ave	Oakdale Rd	Upgrade all crosswalks to high-visibility crosswalks and provide a leading pedestrian interval for all crossing phases. Study removal of the slip lane at the northeast corner and realign the bike lane if removed.	2	Long Term	
3	Lancey Dr	Oakdale Rd	Refresh high-visibility crosswalks and provide a leading pedestrian interval for all crossing phases.	2	Long Term	

FIRST PHASE PEDESTRIAN FACILITIES

MODESTO CA
NON-MOTORIZED
TRANSPORTATION PLAN

Pedestrian Recommendations

- First Phase Projects
- Downtown Plan Ped Corridors

Destinations + Boundaries

- Amtrak Station
- College
- Hospital
- Library
- Museum
- School
- Modesto City Boundary
- Shopping Center
- Park

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Map produced December 2018.

Figure 19: Priority Pedestrian Facilities

FUNDING

Table 11 provides high and low planning level per mile cost estimates for each class of bicycle facility (includes 30% extra for "soft" costs). These are order of magnitude planning budgetary figures; a full detail engineering design will be needed to determine the most probable price of individual projects recommended in this document. Based on the planning level cost estimates in Table 11, the full bicycle network build-out would cost approximately between $41,000,000 and $230,000,000.

Table 12 provides planning level per unit/ per mile cost estimates for some pedestrian infrastructure treatments.

Appendix A contains detailed descriptions of local, regional, state, and federal funding opportunities. Table A-1 within Appendix A breaks down funding sources by eligible project types.

Table 11: Bicycle Project Planning Level Cost Estimates

Bikeway Class	Cost Per Mile		Assumptions
	Low	High	
Shared-Use Path	$500,000	$1,500,000	Includes AC path and minor crossing improvements. Does not include signal modification or right-of-way acquisition.
Bicycle Lane	$50,000	$350,000	Low cost assumes signage, striping. High cost assumes green conflict marking, traffic signal modification including bike signal detection.
Buffered Bicycle Lane	$100,000	$400,000	Low cost assumes signage, striping, and a painted buffer. High cost assumes green conflict marking, traffic signal modification including bike signal detection, and wayfinding signage.
Bicycle Boulevard	$70,000	$1,000,000	Low cost assumes signage, striping, and minor traffic calming such as speed humps, and up to 3 other elements such as medians, diverters or a raised crosswalk. High cost assumes low cost items plus traffic circles, curb extensions, traffic signal modification including bike signal detection, and wayfinding signage.
Bicycle Route	$15,000	$25,000	Includes signage and striping.
Separated Bikeway	$300,000	$1,500,000	Low cost assumes signage, striping, and a painted buffer with flexible delineators. High cost assumes green conflict marking, traffic signal modification including bike signal detection, and a raised concrete buffer.

Table 12: Pedestrian Project Planning Level Cost Estimates

Facility Type	Cost	Unit	Notes
High-visibility crosswalk	$4,000	Each	
Transverse crosswalk	$3,000	Each	
Curb extensions/Corner Radii	$50,000	Each	Varies by size
Leading Pedestrian Interval	$100,000	Each	Cost varies based on the cost of existing and required equipment
Slip Lane (Free-Right Turn Lane) Removal	$100,000	Each	Varies by size
Pedestrian-only Signal Phase	$100,000	Each	Cost varies based on the cost of existing and required equipment
Median Refuge Island	$50,000	Each	Varies by size
Curb Ramps	$5,000	Each	
Signage	$500	Each	
RRFB	$60,000	Each	
Pavement Markings (stop/yield)	$2,000	Each	
Wayfinding Signs	$30,000	Per Mile	Ten signs per mile
Neighborhood Traffic Circle	$150,000	Each	
Median (short)	$50,000	Each	Varies by size
Protected Intersection	$500,000	Each	
Pedestrian Hybrid Beacon	$400,000	Each	
Red Curb Paint	$26,500	Per Mile	
Sidewalk	$500,000	Per Mile	Six-foot wide sidewalk on one side of the street

INTERAGENCY COORDINATION

As previously mentioned, some of the recommendations in the Plan are on the right-of-way of agencies other than the City of Modesto, like Caltrans or County Flood Control. These projects will need to be carefully coordinated with the appropriate stakeholders for planning, design, funding, and implementation purposes. While within city limits, as it is their property, the other agency has the final say over these projects.

APPENDIX A

Funding Sources

Local and Regional Funding

MEASURE L

Measure L is a 25-year half-cent sales tax in Stanislaus County. Measure L provides funding for local transportation projects including street maintenance, traffic safety improvements, and safe routes to schools. 5% of program funds are allocated for bicycle and pedestrian improvements (~$700,000 annually for Modesto).

Funds are programmed by the Stanislaus Council of Governments (StanCOG).

SJVAPCD BIKE PATHS PROGRAM

The San Joaquin Valley Air Pollution Control District has a Bicycle Paths program that will assist funding some bicycle projects. The program will currently help fund Class I, Class II, and Class III bicycle facilities; up to $150,000 per project (depending on bikeway class). Award amounts are capped at $150,000 per jurisdiction per year. Projects must work toward reducing vehicle miles traveledand air emissions.

Funds are programmed by the San Joaquin Valley Air Pollution Control District (SJVAPCD).

NEW DEVELOPMENT OR REDEVELOPMENT/ REHABILITATION

Future new development and redevelopment projects including new road construction, resurfacing, and construction projects are one method of providing pedestrian improvements and bike facilities. To ensure that pedestrian and bicycle improvements are included in these projects, it is important that the review process includes an individual (designated active transportation coordinator) or group (BPAC) to monitor the review process.

Funds are programmed by the City of Modesto.

ASSESSMENT DISTRICTS

Different types of assessment districts can be used to fund the construction and maintenance of bikeway facilities. Examples include Mello-Roos Community Facility Districts, Infrastructure Financing Districts (SB 308), Open Space Districts, or Lighting and Landscape Districts. These types of districts have specific requirements relating to the establishment and use of funds.

Funds are programmed by the City of Modesto.

IMPACT FEES

Another potential local source of funding are developer impact fees, typically tied to trip generation and traffic impacts as a result of proposed projects. A developer may be required to help mitigate the overall impact of vehicular trips by paying an impact fee; the City should ensure that planning policies consider bicycle and pedestrian planning, design, and construction costs to be an eligible uses of these fees.

Funds are programmed by the City of Modesto.

State and Federal Grant Programs

CALIFORNIA ACTIVE TRANSPORTATION PROGRAM

California's Active Transportation Program funds infrastructure and programmatic projects that support the program goals of shifting trips to walking and bicycling, reducing greenhouse gas emissions, and improving public health. Competitive application cycles occur every one to two years, typically in the spring or early summer. Eligible projects include construction of bicycling and walking facilities, new or expanded programmatic activities, or projects that include a combination of infrastructure and non-infrastructure components. Typically, no local match is required, though extra points are awarded to applicants who do identify matching funds.

Funds are programmed by the California Transportation Commission (CTC).

SUSTAINABLE TRANSPORTATION PLANNING GRANTS

Caltrans Sustainable Transportation Planning Grants are available to communities for planning, study, and design work to identify and evaluate projects, including conducting outreach or implementing pilot projects. Communities are typically required to provide an 11.47% local match, but staff time or in-kind donations are eligible to be used for the match provided the required documentation is submitted.

Funds are programmed by Caltrans.

HIGHWAY SAFETY IMPROVEMENT PROGRAM

Caltrans offers Highway Safety Improvement Program (HSIP) grants every one to two years. Projects on any publicly owned road or active transportation facility are eligible, including bicycle and pedestrian improvements. HSIP focuses on projects that explicitly address documented safety challenges through proven countermeasures, are implementation-ready, and demonstrate cost-effectiveness.

Funds are programmed by Caltrans.

SOLUTIONS FOR CONGESTED CORRIDORS PROGRAM

Funded by SB1, the Congested Corridors Program strives to reduce congestion in highly traveled and congested roads through performance improvements that balance transportation improvements, community impacts, and environmental benefits. This program can fund a wide array of improvements including bicycle facilities and pedestrian facilities. Eligible projects must be detailed in an approved corridor-focused planning document. These projects must include aspects that benefit all modes of transportation using an array of strategies that can change travel behavior, dedicate right-of-way for bikes and transit, and reduce vehicle miles traveled.

Funds are programmed by the CTC.

OFFICE OF TRAFFIC SAFETY

Under the Fixing America's Surface Transportation Act, 5% of Section 405 funds are dedicated to addressing non-motorized safety. These funds may be used for law enforcement training related to pedestrian and bicycle safety, enforcement campaigns, and public education and awareness campaigns.

Funds are programmed by the California Office of Traffic Safety.

RECREATIONAL TRAILS PROGRAM

The Recreational Trails Program helps provide recreational trials for both motorized and non-motorized trail use. Eligible products include trail maintenance and restoration, trailside and trailhead facilities, equipment for maintenance, new trail construction, and more.

Funds are programmed by the California Department of Parks and Recreation.

AFFORDABLE HOUSING AND SUSTAINABLE COMMUNITIES PROGRAM

The Affordable Housing and Sustainable Communities Program funds land-use, housing, transportation, and land preservation projects that support infill and compact development that reduces greenhouse gas (GHG) emissions. Projects must fall within one of three project area types: transit-oriented development, integrated connectivity project, or rural innovation project areas. Fundable activities include affordable housing developments, sustainable transportation infrastructure, transportation-related amenities, and program costs.

Funds are programmed by the Strategic Growth Council and implemented by the Department of Housing and Community Development.

URBAN GREENING GRANTS

Urban Greening Grants support the development of green infrastructure projects that reduce GHG emissions and provide multiple benefits. Projects must include one of three criteria, most relevantly: reduce commute vehicle miles traveled by constructing bicycle paths, bicycle lanes or pedestrian facilities that provide safe routes for travel between residences, workplaces, commercial centers, and schools. Eligible projects include green streets and alleyways and non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools.

Funds are programmed by the California Natural Resources Agency.

HABITAT CONSERVATION FUND

The Habitat Conservation Fund Program supports projects that bring urban residents into park and wildlife areas, protect plant and animal species, and acquire and develop wildlife corridors and trails.

Funds are programmed by the California Department of Parks and Recreation.

STATEWIDE PARK PROGRAM (SPP)

The Statewide Park Program solicits competitive grants to fund new parks and recreation opportunities in critically underserved communities across California. Funds can be used to create and expand/ renovate existing parks. All projects must include at least one "recreation feature" which includes non-motorized trails. No match is required.

Funds are programmed by the California Department of Parks and Recreation.

Other State Funds

SENATE BILL 1: LOCAL PARTNERSHIP PROGRAM

This program provides local and regional agencies that have passed sales tax measures, developer fees, or other transportation-imposed fees to fund road maintenance and rehabilitation, sound walls, and other transportation improvement projects. Jurisdictions with these taxes or fees are then eligible for a formulaic annual distribution of no less than $100,000. These jurisdictions are also eligible for a competitive grant program. Local Partnership Program funds can be used for a wide variety of transportation purposes including roadway rehabilitation and construction, transit capital and infrastructure, bicycle and pedestrian improvements, and green infrastructure.

Funds are programmed by CTC.

SENATE BILL 1: ROAD MAINTENANCE AND REHABILITATION PROGRAM

Senate Bill 1 created the Road Maintenance and Rehabilitation Program to address deferred maintenance on state highways and local road systems. Program funds can be spent on both design and construction efforts. On-street active transportation-related maintenance projects are eligible if program maintenance and other thresholds are met. Funds are allocated to eligible jurisdictions.

Funds are programmed by the State Controller's Office.

Table A-1: Funding Sources by Eligible Project Types

Funding Source	Planning / Design / Construction	On-Street Bikeways	Trails	Safe Routes to School	Safe Routes to Transit	Crossings / Intersections	Programs	Studies
Local & Regional Programs								
Measure L (StanCOG)	*P D C*	◆	◆	◆	◆	◆		
Bike Paths Program (SJVAPCD)	*C*	◆	◆	◆	◆			
New Developments/Resurfacing Projects (Modesto)	*D C*	◆	◆			◆		
Assessment Districts (Modesto)	*P D C*	◆	◆	◆	◆	◆	◆	◆
Impact Fees (Modesto)	*P D C*	◆	◆	◆	◆	◆	◆	◆
Competitive Grant Programs								
Active Transportation Program (CTC)	*P D C*	◆	◆	◆	◆	◆	◆	◆
Sustainable Transportation Planning Grants (Caltrans)	*P*							◆
Highway Safety Improvement Program (Caltrans)	*D C*	◆		◆	◆	◆		
Solutions for Congested Corridors (CTC)	*C*	◆	◆			◆		
Office of Traffic Safety (CA OTS)	--						◆	
Recreational Trails Program (CA DPR)	*C*		◆					
Affordable Housing & Sustainable Communities (CA HCD)	*C*	◆			◆		◆	
Urban Greening Grants (CA NRA)	*C*	◆	◆	◆	◆			
Statewide Park Program (CA DPR)	*C*		◆					
Other State Funds								
Local Partnership Program (CTC)	*C*	◆		◆	◆	◆		
Road Maintenance and Rehabilitation Program (Controller's Office)	*D C*	◆		◆	◆			

APPENDIX B

Bicycle Recommendation Table

Table B-1: Bicycle Recommendations

Street	To	From	Bikeway Class	Miles
12th St	Needham St	D St	Class IV	0.93
14th St	D St	Needham St	Class II	0.41
17th St	F St	Downey Ave, J St	Class II	0.36
19th St	Burney St, La Loma Ave	Downey Ave	Class II	0.09
8th St	B St	Kansas Ave	Class I	1.35
9th St	S 9th St, Trail Connector, S Morton Blvd	Tully Rd	Class IV	1.66
B St	9th St	7th St	Class IV	0.19
Belharbour Dr	Dermond Rd	Temescal Dr	Class IIB	0.50
Blue Gum Ave	N Carpenter Rd	Morse Rd	Class IIB	1.00
Brink Ave	Student Center Dr	North city limit	Class I	0.36
Carpenter Rd	Maze Blvd	Chicago Ave	Class IV	0.99
Claus Rd	Yosemite Blvd	Creekwood Dr	Class IV	0.84
Claus Rd	E Briggsmore Ave	Northern city limit	Class IV	1.77
Coffee Rd	Briggsmore Ave	Scenic Dr	Class IV	1.25
Coffee Rd	North city limit	Briggsmore Ave	Class IV	2.37
Coldwell Ave	Sycamore Ave	College Ave	Class II	0.58
College Ave	W Briggsmore Ave	Bowen Ave	Class III	0.26
College Ave	10th St, Needham St	Stoddard Ave	Class IV	0.25
Creekwood Dr	Norseman Dr	Yosemite Blvd	Class IIB	1.25
Crows Landing Rd	City Limit	E Hatch Rd	Class IV	0.85
Crows Landing Rd	Amador Ave	W Whitmore Ave	Class IV	0.89
D St	7th St	Burney St	Class IV	0.49
D St	7th St	Burney St	Class I	0.42

Street	To	From	Bikeway Class	Miles
Dale Rd	Standiford Ave	Pelandale Ave	Class IV	1.04
Dale Rd	Pelandale Ave	Kiernan Ave	Class I	0.79
Downey Ave	McHenry Ave	N Morton Blvd	Class II	0.50
E Briggsmore Ave	McHenry Ave	Claus Rd	Class I	4.03
El Vista Ave	Yosemite Blvd	Oakdale Rd	Class IV	0.98
Encina Ave Trail	Phoenix Ave	Lincoln Ave	Class I	1.31
F St	9th St	12th St	Class II	0.36
Fine Ave	Merle Ave	Hillglen Ave	Class II	0.96
G St	2nd St	La Loma Ave	Class IV	1.25
H St	1st St	Downey Ave	Class IV	1.34
Hashem Dr	Carson Oak Dr, Sylvan Ave	Oakdale Rd	Class II	0.90
I St	Washington St	17th St	Class I	1.13
K St	4th St	Needham St	Class IV	0.86
Kansas Ave	8th St	Morse Rd	Class II	2.15
Lakewood Ave	Briggsmore Ave	Scenic Dr	Class IV	0.81
Lakewood Ave	Briggsmore Ave	Scenic Dr	Class I	0.81
Lakewood-Lincoln Ave Trail Bridge	Scenic Dr	Dry Creek Trail Connector/Bridge	Class I	0.19
Lateral Number 1	Snyder Ave	Modesto Virginia Corridor	Class I	1.12
Lateral Number 4	9th St	N Carpenter Rd	Class I	1.42
Lateral Number 4	Modesto Virginia Corridor, College Ave	9th St	Class I	0.19
Lateral Number 5	Lateral Number 4	S Carpenter Rd	Class I	1.48
Lateral Number 6	Sisk Rd	Prescott Rd, Snyder Ave	Class I	2.58
Legion Park Dr	S Santa Cruz Ave	Tioga Dr	Class I	0.51

Street	To	From	Bikeway Class	Miles
Lincoln Ave Trail	Scenic Trail Connector	Yosemite Blvd	Class I	0.99
Litt Rd	Sylvan Ave	Kodiak Dr	Class II	0.39
Mable Ave	Coffee Rd	Oakdale Rd	Class IV	0.99
Maze Blvd	Washington St	Helen White Memorial Trail	Class IV	0.42
Millbrook Ave	Sylvan Ave	Belharbour Dr, Dermond Rd	Class IV	0.60
Modesto Virginia Corridor	Woodrow Ave	Pelandale Ave	Class I	1.03
Morse Rd	Kansas Ave	Blue Gum Ave	Class II	1.00
Morse Rd	Blue Gum Ave	North end of the street	Class II	0.15
Morton Blvd	Rue De Yoe	Yosemite Blvd	Class I	0.54
N Carpenter Rd	Maze Blvd	Fire Science Ln, Student Center Dr	Class I	1.57
N Carpenter Rd	N 9th St	W Briggsmore Ave	Class I	0.18
N Emerald Ave	Maze Blvd	Kanas Ave	Class II	0.51
N Martin Luther King Dr	Ash St	Sutter Ave, Tuolumne Blvd, Paradise Ave	Class II	0.11
N McClure Rd	Dry Creek Dr	N McClure Rd Connector Trail	Class II	0.11
N McClure Rd Connector	N McClure Rd	Scenic Trail	Class I	0.13
Needham St	McHenry Ave	Park Ave	Class II	0.28
Norseman Dr	South end of street	Garst Rd	Class II	0.53
Oakdale Rd	E Orangeburg Ave	Sylvan Ave	Class IV	2.51
Oakdale Rd	El Vista Ave	E Orangeburg Ave	Class IV	0.77

Street	To	From	Bikeway Class	Miles
Paradise Ave	Beverly Dr, Harris Ave, Wade Ave	South city limit	Class IV	0.45
Paradise Ave	S Washington St, H St	Sheridan St	Class IIB	0.66
Parker Rd	Claus Rd, E Briggsmore Ave	East city limit	Class IV	0.98
Pelandale Ave	Modesto Virginia Corridor	Salida Blvd	Class IV	3.85
Prescott Rd	Bangs Ave	W Briggsmore Ave	Class IV	2.39
Root Lateral	E Briggsmore Ave, Coffee Rd	Virginia Ave, W Morris Ave	Class I	1.99
Roselle Ave	E Briggsmore Ave	North city limit	Class IV	2.09
S Conejo Ave	Tioga Dr	Tioga Dr	Class IV	0.16
S Morton Blvd	N 7th St	11th St	Class I	0.40
S Morton Blvd	Grand St, Toulume River Trail Extension	Yosemite Blvd	Class IV	0.02
S Morton Blvd	11th St	Grand St	Class I	0.52
S Washington St	Maze Blvd	Paradise Ave	Class IV	0.50
Scenic Dr (EB)	McGuire Dr	Lakewood Ave	Class II	0.75
Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class I	0.89
Scenic Dr (WB)	McGuire Dr	Lakewood Ave	Class IV	0.77
Sierra Dr	7th St, S Morton Blvd	Sunset Blvd, 3rd St	Class IV	0.43
Standiford Ave	McHenry Ave	Dale Rd	Class IV	3.14
Sutter Ave	Rouse Ave	Robertson Rd	Class II	0.50
Sylvan Ave	McHenry Ave	Jeffrey Dr	Class IV	2.34
Sylvan Ave	Jeffrey Dr	Claus Rd	Class IIB	1.65
Tioga Dr	Monterey Ave	Hillside Dr	Class IV	0.19
Tioga Dr	S Conejo Ave	Monterey Ave	Class I	0.16

Street	To	From	Bikeway Class	Miles
Tully Rd	Briggsmore Ave	Standiford Ave	Class IIB	1.30
Tully Rd	Standiford Ave	Pelandale Ave	Class IV	0.77
Tully Rd	Stoddard Ave	W Briggsmore Ave	Class IV	1.44
W Briggsmore Ave	McHenry Ave	N Carpenter Rd	Class IV	2.28
W Briggsmore Ave	McHenry Ave	N Carpenter Rd	Class IV	2.29
W Hatch Rd	East City limit	Monticello Ln	Class IV	1.39
W Orangeburg Ave	Carver Rd	Evergreen Ave	Class II	0.59
Yosemite Blvd	D St	City Limit	Class IV	3.80

Table 13: Bicycle Recommendations - Bicycle Boulevards

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Snyder Bike Boulevard Group	Blue Bird Dr	Pelandale Ave	Vintage Dr	Class IIIB	0.53
	Eastport Dr	Snyder Ave	Northern end of street	Class IIIB	0.23
	Gagos Dr	Pelandale Ave	Vintage Dr	Class IIIB	0.57
	Marsala Way	Veneman Ave	Snyder Ave	Class IIIB	0.51
	Pickford Way	Snyder Ave	Warm Springs Dr	Class IIIB	0.13
	Snyder Ave	Carver Rd	Blue Bird Dr	Class IIIB	1.98
	Veneman Ave	Conant Ave	West of Dale Rd	Class IIIB	0.61
	Vintage Dr	Gagos Dr	Blue Bird Dr	Class IIIB	0.10
	Warm Springs Dr	Eastport Dr	Pickford Way	Class IIIB	0.23
West Rumble Bike Boulevard Group	Budd St	Park Pl	Conant Ave	Class IIIB	0.10
	Chrysler Dr	Prescott Rd	Park Pl	Class IIIB	0.34
	Conant Ave	Sisk Rd	Veneman Ave	Class IIIB	1.17
	Park Pl	Budd St	W Rumble Rd	Class IIIB	0.36
	W Rumble Rd	McHenry Ave	Sisk Rd	Class IIIB	3.07
Carver Bike Boulevard Group	Bowen Ave	McHenry Ave	Tully Rd	Class IIIB	1.00
	Carver Rd	N 9th St	Bangs Ave	Class IIIB	3.28
	Cheyenne Way	Carver Rd	Prescott Rd	Class IIIB	0.52
	College Ave	Bowen Ave	W Rumble Rd	Class IIIB	0.62
	Higbee Dr	Tully Rd	Otis Ave	Class IIIB	0.40
	Leveland Ln	McKenry Ave	College Ave	Class IIIB	0.62
	Mount Vernon Dr	College Ave	Prescott Rd	Class IIIB	1.37
	Otis Ave	Higbee Dr	Sheldon Dr	Class IIIB	0.05
	Sheldon Dr	Royalton Ave	Prescott Rd	Class IIIB	0.84

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Roseburg/ Princeton Bike Boulevard Group	Campus Way	N 9th St	Stoddard Ave	Class IIIB	0.21
	Coldwell Ave	College Ave	N 9th St	Class IIIB	0.53
	Evergreen Ave	Carver Rd	Sisk Rd, W Briggsmore Ave	Class IIIB	0.52
	Griswold Ave	McHenry Ave	Virginia Corridor	Class IIIB	0.51
	Kearney Avey	Princeton Ave	Princeton Ave	Class IIIB	0.02
	Poplar Ave	Needham St	Stoddard Ave	Class IIIB	0.24
	Princeton Ave	Griswold Ave, Modesto Virginia Corridor	Kearney Ave	Class IIIB	0.78
	Princeton Ave	Kearney Ave	Carver Rd	Class IIIB	0.29
	Stoddard Ave	Sycamore Ave	College Ave	Class IIIB	0.54
	Sycamore Ave	Stoddard Ave	Griswold Ave	Class IIIB	0.44
	Virginia Ave	Stoddard Ave	W Morris Ave, Root Lateral	Class IIIB	0.13
	W Morris Ave	McHenry Ave	Sycamore Ave	Class IIIB	0.21
	W Roseburg Ave	McHenry Ave	Carver Rd	Class IIIB	1.54
West Modesto Bike Boulevard Group	2nd St	G St	Blue Gum Ave	Class IIIB	0.35
	5th St	Blue Gum Ave	F St, Student Center Dr	Class IIIB	0.31
	Chapparal Pl	Morse Rd	N Rosemore Ave	Class IIIB	0.50
	G St	Student Center Dr	2nd St	Class IIIB	0.28
	Mercy Ave	Woodland Ave	Kansas Ave	Class IIIB	0.50
	N Rosemore Ave	Kansas Ave	Finley Ct	Class IIIB	0.19
	N Rosemore Ave	Woodland Ave	Blue Gum Ave	Class IIIB	0.51
	Poust Rd	Woodland Ave	Blue Gum Ave	Class IIIB	0.51

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
West Modesto Bike Boulevard Group	Shaddox Ave	Seneca Pl, Seneca Ct	N Rosemore Ave	Class IIIB	0.25
	Shasta Ave	Kansas Ave	Alum Rock Ct	Class IIIB	0.19
	Student Center Dr	5th St	N Carpenter Rd	Class IIIB	0.53
	Torrid Ave	N Carpenter Rd	Western city limit	Class IIIB	0.42
	Woodland Ave	N Carpenter Rd	Morse Rd	Class IIIB	1.00
Union/ E Rumble Bike Boulevard Group	Barringham Ln	Lancashire Ln	Dragoo Park Dr	Class IIIB	0.07
	Beyer Park Dr	Forest Glenn Dr	Claratina Ave	Class IIIB	0.70
	Claremont Ave	E Rumble Rd	Dragoo Park Dr	Class IIIB	0.28
	Dragoo Park Dr	Claremont Ave	Grecian Ave	Class IIIB	0.92
	Drakeshire Dr	Montana Dr	Grecian Ave	Class IIIB	0.03
	E Rumble Rd	McHenry Ave	Hashem Dr	Class IIIB	1.73
	E Union Ave	McHenry Ave	Dragoo Park Dr	Class IIIB	0.53
	Forest Glenn Dr	Sylvan Ave	Beyer Park Dr	Class IIIB	0.08
	Grecian Ave	Drakeshire Dr	McHenry Ave, State Hwy 108	Class IIIB	0.73
	Greenwich Ln	Robin Hood Dr	Lancashire Ln	Class IIIB	0.43
	Keller St	Floyd Ave	Coffee Villa Dr	Class IIIB	0.41
	Keller St	Clovewood Ave	Sylvan Ave	Class IIIB	0.19
	Kentwood Ave	Beyer Park Dr	Northview Dr	Class IIIB	0.17
	Lancashire Ln	Greenwich Ln	Barringham Ln	Class IIIB	0.05
	Montana Dr	Coffee Rd	Drakeshire Dr	Class IIIB	0.27
	Northview Dr	Sylvan Meadows Dr	Mable Ave	Class IIIB	0.20
	Palmwood Dr	Sylvan Ave	Mable Ave	Class IIIB	0.50

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Union/ E Rumble Bike Boulevard Group	Robin Hood Dr	McHenry Ave	Greenwich Ln	Class IIIB	0.07
	Sylvan Meadows Dr	Dragoo Park Dr	Palmwood Dr	Class IIIB	1.15
	W Union Ave	McHenry Ave	Tully Rd	Class IIIB	1.01
	Woodrow Ave	McHenry Ave	Tully Rd	Class IIIB	1.00
Floyd/ Sunrise Bike Boulevard Group	Bodem St	Morris Ave	Lucern Ave	Class IIIB	0.12
	Bronson Ave	W Orangeburg Ave	W Granger Ave	Class IIIB	0.25
	E Fairmont Ave	Sunrise Ave	Coffee Rd	Class IIIB	0.50
	E Granger Ave	McHenry Ave	Sunrise Ave	Class IIIB	0.50
	E Morris Ave	McHenry Ave	Coffee Rd	Class IIIB	1.00
	E Roseburg Ave	McHenry Ave	Root Lateral	Class IIIB	0.56
	El Vecino Ave	E Morris Ave	E Orangeburg Ave	Class IIIB	0.87
	Floyd Ave	McHenry Ave	Fine Ave	Class IIIB	1.99
	Johnson St	Downey Ave	Lucern Ave, Ila Way, Root Lateral	Class IIIB	0.50
	Lucern Ave	Johnson St, Ila Way, Root Lateral	Sunnyside Ave	Class IIIB	1.00
	Sheffield Ln	Sunrise Ave	E Rumble Rd	Class IIIB	0.13
	Sherwood Ave	W Granger Ave	W Briggsmore Ave	Class IIIB	0.19
	Sunnyside Ave	Lucern Ave	Locke Rd	Class IIIB	0.09
	Sunrise Ave	Bodem St	Sheffield Ln	Class IIIB	2.04
	Tokay Ave	McHenry Ave	Sunrise Ave	Class IIIB	0.50
	W Granger Ave	McHenry Ave	College Ave	Class IIIB	0.75

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Orangeburg/ Rose Bike Boulevard Group	Brighton Ave	Locke Rd	Coffee Rd	Class IIIB	0.65
	Celeste Dr	Coffee Rd	Oakdale Rd	Class IIIB	1.00
	E Orangeburg Ave	McHenry Ave	Held Dr	Class IIIB	3.44
	Eastridge Dr	Surrey Ave	E Orangeburg Ave	Class IIIB	0.45
	Glenbrook Way	Springcreek Dr	E Orangeburg Ave	Class IIIB	0.18
	Held Dr	Orangeburg Ave	North end of street	Class IIIB	0.44
	Lillian Dr	Springcreek Dr	E Orangeburg Ave	Class IIIB	0.28
	Locke Rd	Coffee Rd	Rose Ave	Class IIIB	0.50
	Middleboro Pl	Eastridge Dr	Lakewood Ave	Class IIIB	0.27
	Muirswood Way	Wylie Dr	E Orangeburg Ave	Class IIIB	0.38
	Rose Ave	Locke Rd	Floyd Ave	Class IIIB	1.66
	Sonoma Ave	Surrey Ave	E Orangeburg Ave	Class IIIB	0.50
	Springcreek Dr	Scenic Dr	Glenbrook Way	Class IIIB	0.39
	Surrey Ave	Oakdale Rd	Eastridge Dr	Class IIIB	0.74
	Vera Cruz Dr	Celeste Dr	Floyd Ave	Class IIIB	0.42
	Woodbine Dr	Lillian Dr	Springcreek Dr	Class IIIB	0.27
	Wylie Dr	Brighton Ave	Oakdale Rd	Class IIIB	0.76
	Wylie Dr	Brighton Ave	Oakdale Rd	Class IIIB Bicycle Boulevard	0.76

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Merle Bike Boulevard Group	Dermond Rd	Merle Ave	Belharbour Dr, Millbrook Ave	Class IIIB	0.25
	Lincoln Oak Dr	Merle Ave	Kodiak Dr	Class IIIB	0.50
	Maid Mariane Ln	Merle Ave	Allan Adale Ct	Class IIIB	0.21
	Merle Ave	Oakdale Rd	Claus Rd	Class IIIB	1.99
	Oaklawn Dr	Lincoln Oak Dr	Temescal Dr	Class IIIB	0.23
	Sharon Ave	Snowy Egret St	Fine Ave	Class IIIB	0.20
	Temescal Dr	Oaklawn Dr	Bellharbour Dr	Class IIIB	0.02
	Wisdom Way	Merle Ave	Southern end of street	Class IIIB	0.12
Hillglen/ Kodiak Bike Boulevard Group	Hillglen Ave	La Force Dr, Kodiak Dr	Roselle Ave	Class IIIB	0.94
	Hillglen Ave	Esta Ave	Fine Ave	Class IIIB	0.38
	Kodiak Dr	Hillglen Ave	Bear Cub Ln	Class IIIB	0.61
	La Force Dr	Oakdale Rd	Kodiak Dr	Class IIIB	0.16
	Wood Sorrel Dr	Sylvan Ave	Hillglen Ave	Class IIIB	0.25
McClure Bike Boulevard Group	Capistrano Dr	Poppypatch Dr	Penny Ln	Class IIIB	0.19
	Dry Creek Dr	Lincoln Ave	Creekwood Dr	Class IIIB	0.73
	Jarena Dr	N McClure Rd	Creekwood Dr	Class IIIB	0.22
	Mechalys Way	N McClure Rd	Creekwood Dr	Class IIIB	0.22
	N McClure Rd	Yosemite Blvd	Dry Creek Dr	Class IIIB	0.75
	Penny Ln	Lincoln Ave	N McClure Rd	Class IIIB	0.48
	Poppypatch Dr	Capistrano Dr	N McClure Rd	Class IIIB	0.69

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
La Loma/ Encina/ Miller Bike Boulevard Group	Buena Vis	La Loma Ave	Encina Ave, N Santa Rosa Ave	Class IIIB	0.17
	Covena Ave	Yosemite Blvd	Northern end of street	Class IIIB	0.64
	Edgebrook Dr	El Vista Ave	N Riverside Dr	Class IIIB	0.56
	El Rio Ave	El Rio Ave Trail	La Loma Ave	Class IIIB	0.19
	Encina Ave	N Santa Rosa Ave, Buena Vis	Phoenix Ave	Class IIIB	1.00
	Kerr Ave	Yosemite Blvd	Mono Dr	Class IIIB	0.19
	La Loma Ave	19th St, Burney St	Yosemite Blvd	Class IIIB	1.06
	La Sombra Ave	El Rio Ave	Las Palmas Ave	Class IIIB	0.28
	Lane St	Burney St	N Morton Blvd	Class IIIB	0.16
	Las Palmas Ave	Pequino Ave	La Sombra Ave	Class IIIB	0.05
	Miller Ave	La Loma Ave, N Santa Cruz Ave	N Riverside Dr	Class IIIB	1.44
	N Conejo Ave	Yosemite Blvd	Encina Ave	Class IIIB	0.48
	N Morton Blvd	Rue De Yoe	Downey Ave	Class IIIB	0.08
	N Riverside Dr	Yosemite Blvd	Edgebrook Dr	Class IIIB	0.63
	Pequeno Ave	Las Palmas Ave	N Santa Ana Ave	Class IIIB	0.12
	Phoenix Ave	Scenic Trail	Yosemite Blvd	Class IIIB	0.94
	Santa Barbara Ave	Yosemite Blvd	La Loma Ave	Class IIIB	0.18
	Seagull Way	Encina Ave	Encina Ave Trail	Class IIIB	0.01
	Wilson Ave	Pequino Ave	Edgebrook Dr	Class IIIB	0.31
Monterey/ Empire Bike Boulevard Group	Empire Ave	Oregon Dr	Hillside Dr	Class IIIB	0.43
	Hillside Dr	S Santa Cruz Ave	Tioga Dr	Class IIIB	0.49
	Monterey Ave	S Santa Cruz Ave	Tioga Dr	Class IIIB	0.47
	Oregon Dr	S Santa Cruz Ave	S Conejo Ave	Class IIIB	0.38
	Tioga Dr	Hillside Dr	Legion Park Dr	Class IIIB	0.13

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Neece Bike Boulevard Group	2nd St	Sierra Dr	H st	Class IIIB	0.08
	F St	Sierra Dr	3rd St	Class IIIB	0.05
	Merced Ave	5th St, Sierra Dr	Tuolumne Blvd	Class IIIB	0.23
	Neece Dr	Tuolumne Blvd	Sunset Ave	Class IIIB	0.81
	Pelton Ave	Roselawn Ave	Colorado Ave	Class IIIB	0.13
	Roselawn Ave	Roselawn Ct	Colorado Ave	Class IIIB	0.64
	Roselawn Ave	Sierra Dr	South Ave	Class IIIB	0.53
	Rouse Ave	Western city limit	Eastern city limity (east of Roselawn Ave)	Class IIIB	0.10
	Rouse Ave	Neece Dr	Western city limit	Class IIIB	0.18
	Sierra Dr	Sunset Blvd, 3rd St	1st St	Class IIIB	0.16
	Tuolumne Blvd Frontage Road	Neece Dr	Merced Ave	Class IIIB	0.03
Sutter/ Emerald Bike Boulevard Group	Crippen Ave	Kirschen Dr	Yellow Pine Dr	Class IIIB	0.27
	Hammond Ave	Robertson Rd	Rouse Ave	Class IIIB	0.50
	Locust St	Martin Lither King Dr	Maze Ct	Class IIIB	0.21
	Maple St	S Washington St	Briggs Ditch St	Class IIIB	0.37
	N Martin Luther King Dr	Ruberto St	Elm Ave	Class IIIB	0.91
	Pelton Ave	Sutter Ave	Hammond St	Class IIIB	0.38
	Pine Tree Ln	Paradise Rd	Robertson Rd	Class IIIB	0.47
	Red Pine Dr	Crippen Ave	Hammond St	Class IIIB	0.13
	Rouse Ave	Wade Ave	Josi Ln	Class IIIB	0.50
	S Emerald Ave	California Ave	Laurel Ave	Class IIIB	0.72
	Sutter Ave	Paradise Rd	Rouse Ave	Class IIIB	0.50
	Yellow Pine Dr	Crippen Ave	Pine Tree Ln	Class IIIB	0.12

Bicycle Boulevard Group	Street	To	From	Bikeway Class	Miles
Ironside/ Santa Fe Bike Boulevard Group	Boise Ave	W Hatch Rd	Ustick Rd	Class IIIB	0.58
	Cielito Dr	Jardin Way	Rancho Encantado Ln	Class IIIB	0.12
	Ironside Dr	Waldo Ct	Jardin Way	Class IIIB	0.28
	Jardin Way	Cielito Dr	Ironside Dr	Class IIIB	0.09
	Jim Way	Olivero Rd	Winmoore Way	Class IIIB	0.19
	Rancho Encantado Ln	W Hatch Rd	Cielito Dr	Class IIIB	0.18
	Rio Grande Ave	Crows Landing Rd	Santa Fe Ave	Class IIIB	0.26
	Santa Fe Ave	Pecos Ave	Rio Grande Ave	Class IIIB	0.47
	School Ave	Crows Landing Rd	Santa Fe Ave	Class IIIB	0.25
	Tudor Ct	Waldo Ct	Ustick Rd	Class IIIB	0.05
	Ustick Rd	Boise Ave	Tudor Ct	Class IIIB	0.05
	Waldo Ct	Ironside Dr	Tudor Ct	Class IIIB	0.05
	Winmoore Way	Jim Way	Crows Landing Rd	Class IIIB	0.47

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Bicycle and Pedestrian Design Guide

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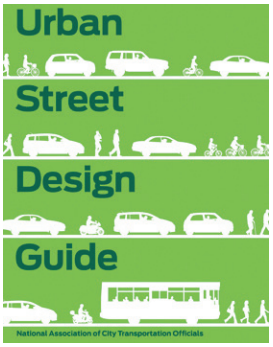
01: Context

Guidance Basis

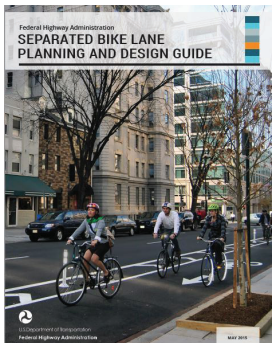
The sections that follow serve as an inventory of pedestrian and bicycle design treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent the tools for creating a bicycle-friendly, safe, accessible community. The guidelines are not, however, a substitute for a more thorough evaluation by a professional upon implementation. The following standards and guidelines are referred to in this guide:

National Guidance

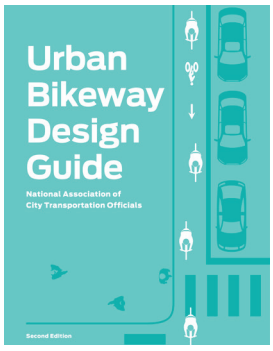


A blueprint for designing 21st century streets, the NACTO Urban Street Design Guide (2013) unveils the toolbox and tactics cities use to make streets safer, more livable, and more economically vibrant. The Guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition. The document charts the principles and practices of the nation's foremost engineers, planners, and designers working in cities.

NCHRP's Improving Pedestrian Safety at Unsignalized Crossings Report recommends engineering treatments to improve pedestrian safety at unsignalized locations with high speeds and traffic volumes.



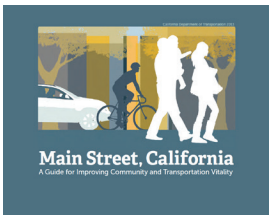
Separated Bike Lane Planning and Design Guide (2015) provides national guidance on the planning and design of separated bike lane facilities. Released by the Federal Highway Administration (FHWA), this guide documents best practices as demonstrated around the U.S., and offers ideas on future areas of research, evaluation, and design flexibility.



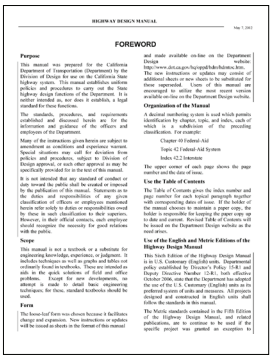
The National Association of City Transportation Officials' (NACTO) Urban Bikeway Design Guide (2012) provides cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists. The designs were developed by cities for cities, since unique urban streets require innovative solutions. In August 2013, the Federal Highway Administration issued a memorandum officially supporting use of the document.

California Guidance

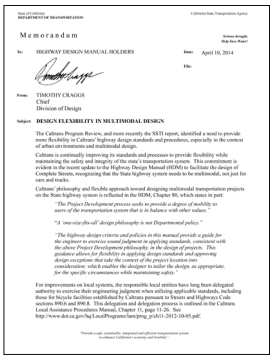
The California Manual on Uniform Traffic Control Devices (CAMUTCD) (2014) is an amended version of the FHWA MUTCD 2009 edition modified for use in California. While standards presented in the CA MUTCD substantially conform to the FHWA MUTCD, the state of California follows local practices, laws and requirements with regards to signing, striping and other traffic control devices.



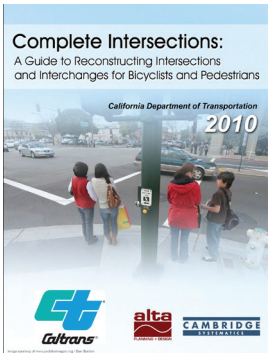
Main Street, California: A Guide for Improving Community and Transportation Vitality (2013) reflects California's current manuals and policies that improve multi-modal access, livability and sustainability within the transportation system. The guide recognizes the overlapping and sometimes competing needs of main streets.



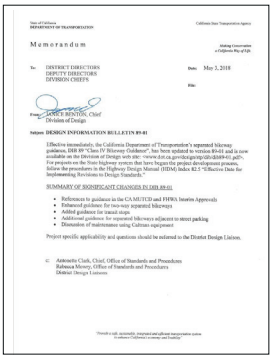
The California Highway Design Manual (HDM) (Updated 2015) establishes uniform policies and procedures to carry out highway design functions for the California Department of Transportation.



The Caltrans Memo: Design Flexibility in Multimodal Design (2014) encourages flexibility in highway design. The memo stated that "Publications such as the NACTO "Urban Street Design Guide" and "Urban Bikeway Design Guide," … are resources that Caltrans and local entities can reference when making planning and design decisions on the State highway system and local streets and roads."



Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010) is a reference guide that presents information and concepts related to improving conditions for bicyclists and pedestrians at major intersections and interchanges. The guide can be used to inform minor signage and striping changes to intersections, as well as major changes and designs for new intersections.



The Caltrans resource Class IV Bikeway Guidance (2018) provides enhanced guidance for two-way separated bikeways, with added information on transit stops and separated bikeways adjacent to street parking. It also provides a discussion of maintenance using Caltrans equipment.

User Design Dimensions

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction, and maintenance practices than motor vehicle drivers.

Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

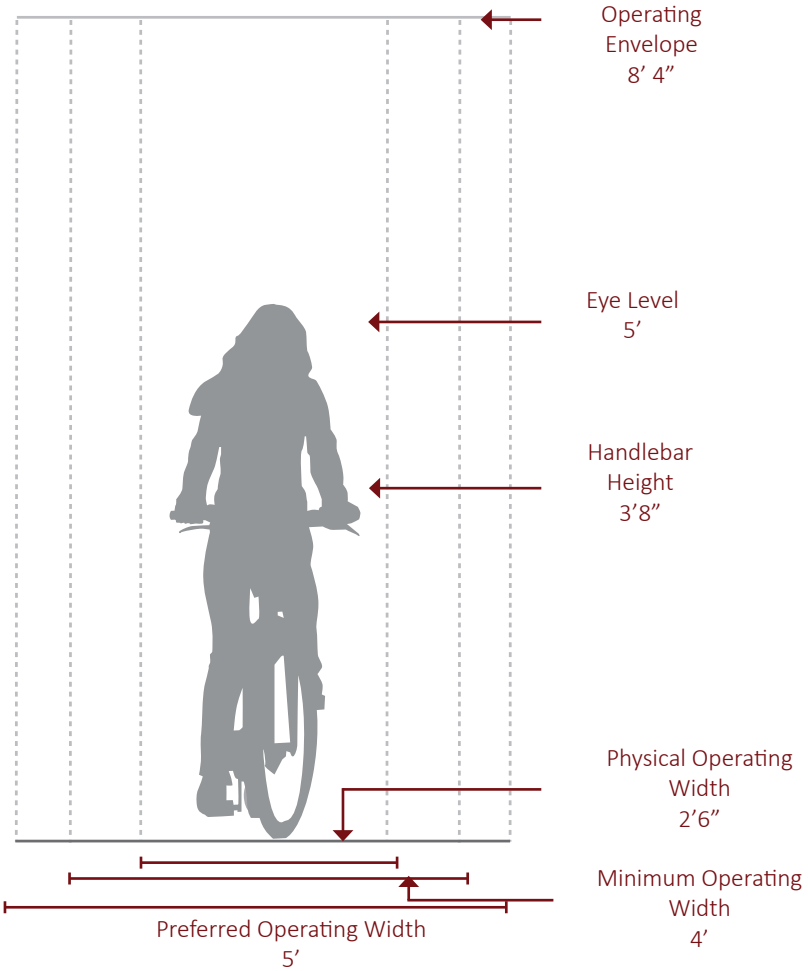
Bicycle as a Design Vehicle

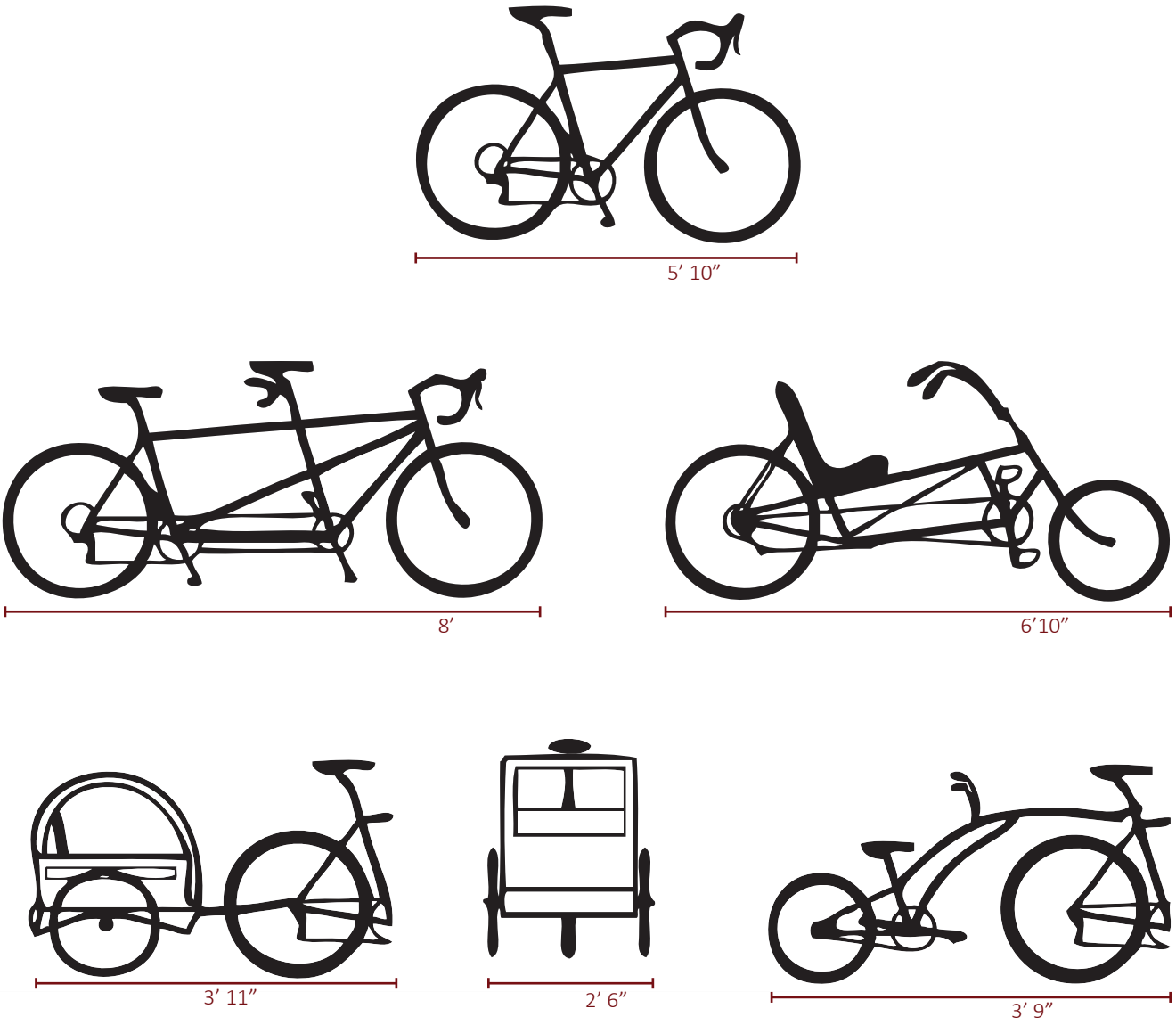
Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The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

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

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

Bicycle Rider - Typical Dimensions





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

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

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	**Paved level surfacing**	**8-12 mph***
	Crossing Intersections	**10 mph**
	Downhill	**30 mph**
	Uphill	**5 -12 mph**
Recumbent Bicyclist	**Paved level surfacing**	**18 mph**

**** Typical speed for causal riders per AASHTO 2013.***

Bicyclist User Type

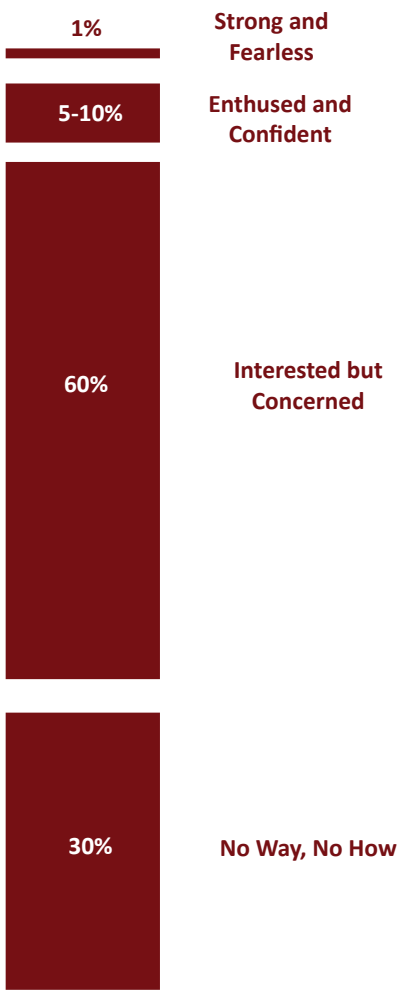
The 2012 AASHTO Guide to the Development of Bicycle Facilities encourages designers to identify their rider type based on the trip purpose (Recreational vs Transportation) and on the level of comfort and skill of the rider (Causal vs Experienced). A user-type framework for understanding a potential rider's willingness to bike is illustrated in the figure below. Developed by planners in Portland, OR and supported by research, this classification identifies four distinct types of bicyclists.

Strong and Fearless – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections (even if shared with vehicles) over separate bicycle facilities such as shared-use paths.

Enthused and Confident - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or shared-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

Interested but Concerned – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or shared-use paths under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.

No Way, No How – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

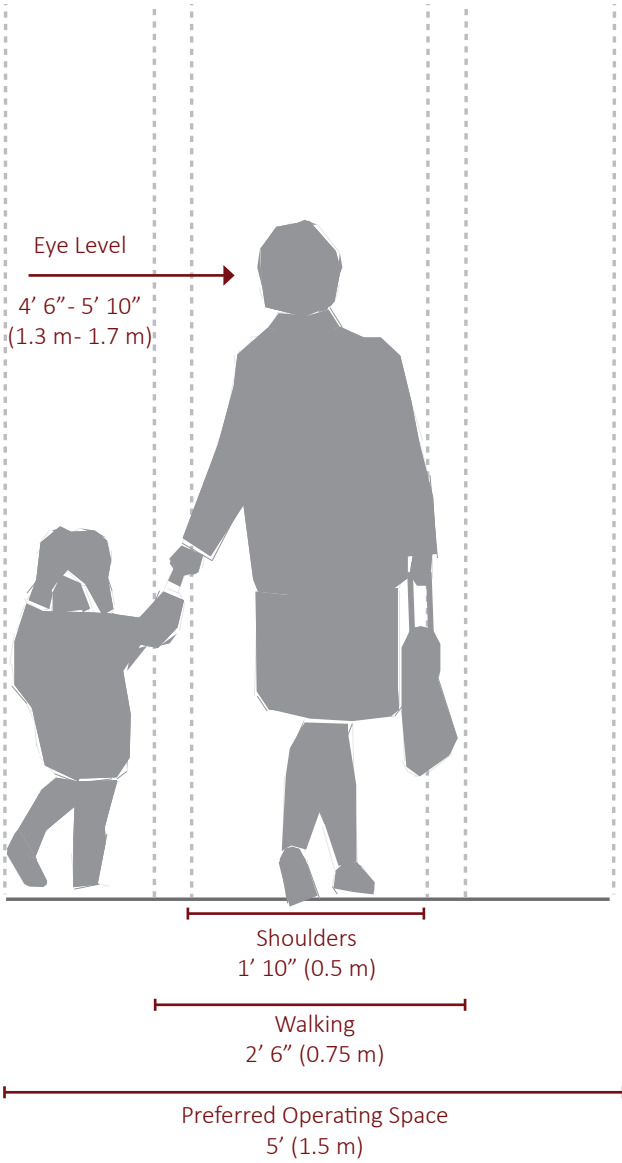


Pedestrian Design Needs

Types of Pedestrians

Pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. The table below summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of 3.5 feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to 3 feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.



Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk
	Requires constant adult supervision
	Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision
	Poor depth perception
9-13	Susceptible to "darting out" in roadways
	Insufficient judgment
	Sense of invulnerability
14-18	Improved awareness of traffic environment
	Insufficient judgment
19-40	Active, aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street
	Vision loss
	Difficulty hearing vehicles approaching from behind

Additional References and Guidelines

AASHTO. Guide for the Planning, Design, and Operation of Pedestrian Facilities, Exhibit 2-1. 2004.

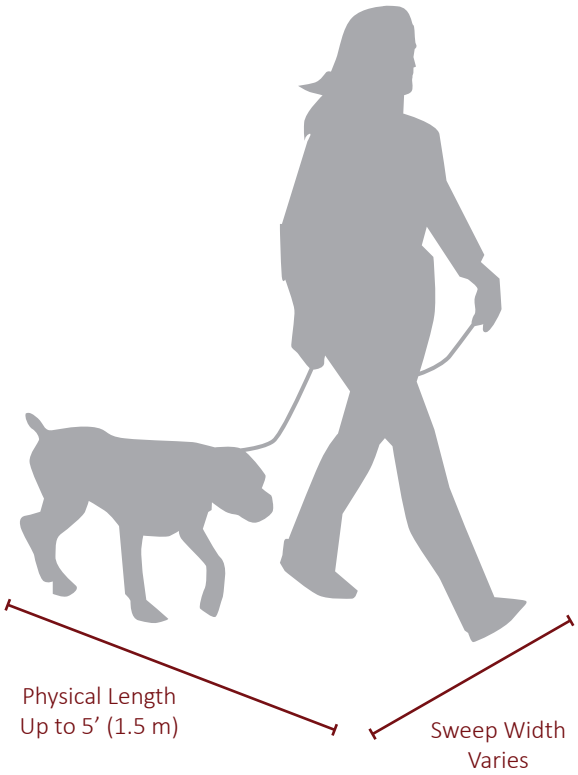
Design Needs of Dog Walkers

Dog walking is a common and anticipated use on shared use paths. Dog sizes vary largely, as does leash length and walking style, leading to wide variation in possible design dimensions.

Shared use paths designed to accommodate wheelchair users are likely to provide the necessary dimensions for the average dog walker. Amenities such as dog waste stations may enhance conditions for dog walkers.

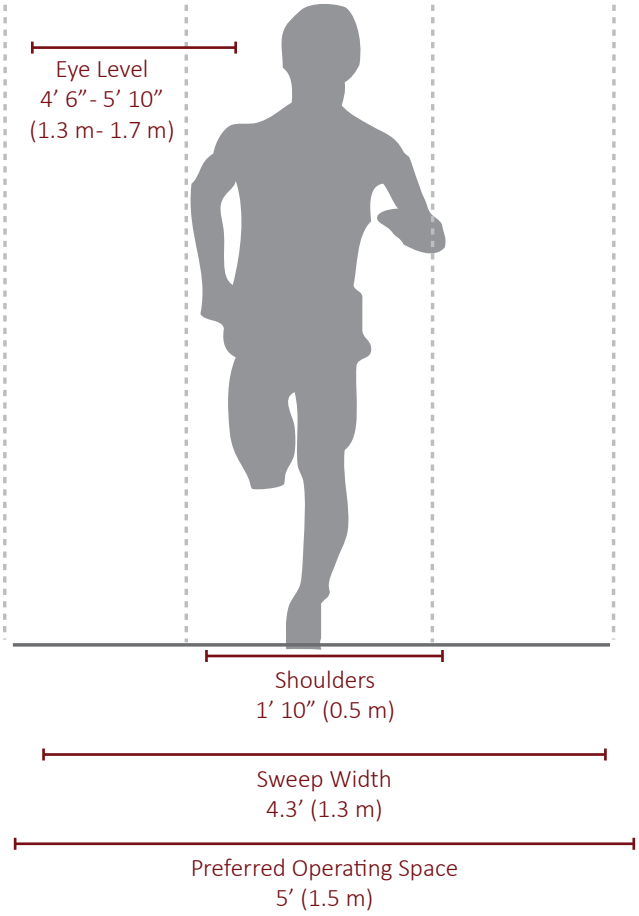
Design Needs of Runners

Running is an important recreation and fitness activity commonly performed on shared use paths. Many runners prefer softer surfaces (such as rubber, bare earth or crushed rock) to reduce impact. Runners can change their speed and direction frequently. If high volumes are expected, controlled interaction or separation of different types of users should be considered.



Runner Typical Speed

User	Typical Speed
Runner	6.2 mph



Additional References and Guidelines

FHWA. Characteristics of Emerging Road and Trail Users and Their Safety. (2004).

Design Needs of Wheelchair Users

As the American population ages, the number of people using mobility assistive devices (such as manual wheelchairs, powered wheelchairs) increases.

Manual wheelchairs are self-propelled devices. Users propel themselves using push rims attached to the rear wheels. Braking is done through resisting wheel movement with the hands or arm. Alternatively, a second individual can control the wheelchair using handles attached to the back of the chair.

Power wheelchairs user battery power to move the wheelchair. The size and weight of power wheelchairs limit their ability to negotiate obstacles without a ramp. Various control units are available that enable users to control the wheelchair movement, based on their ability (e.g., joystick control, breath controlled, etc).

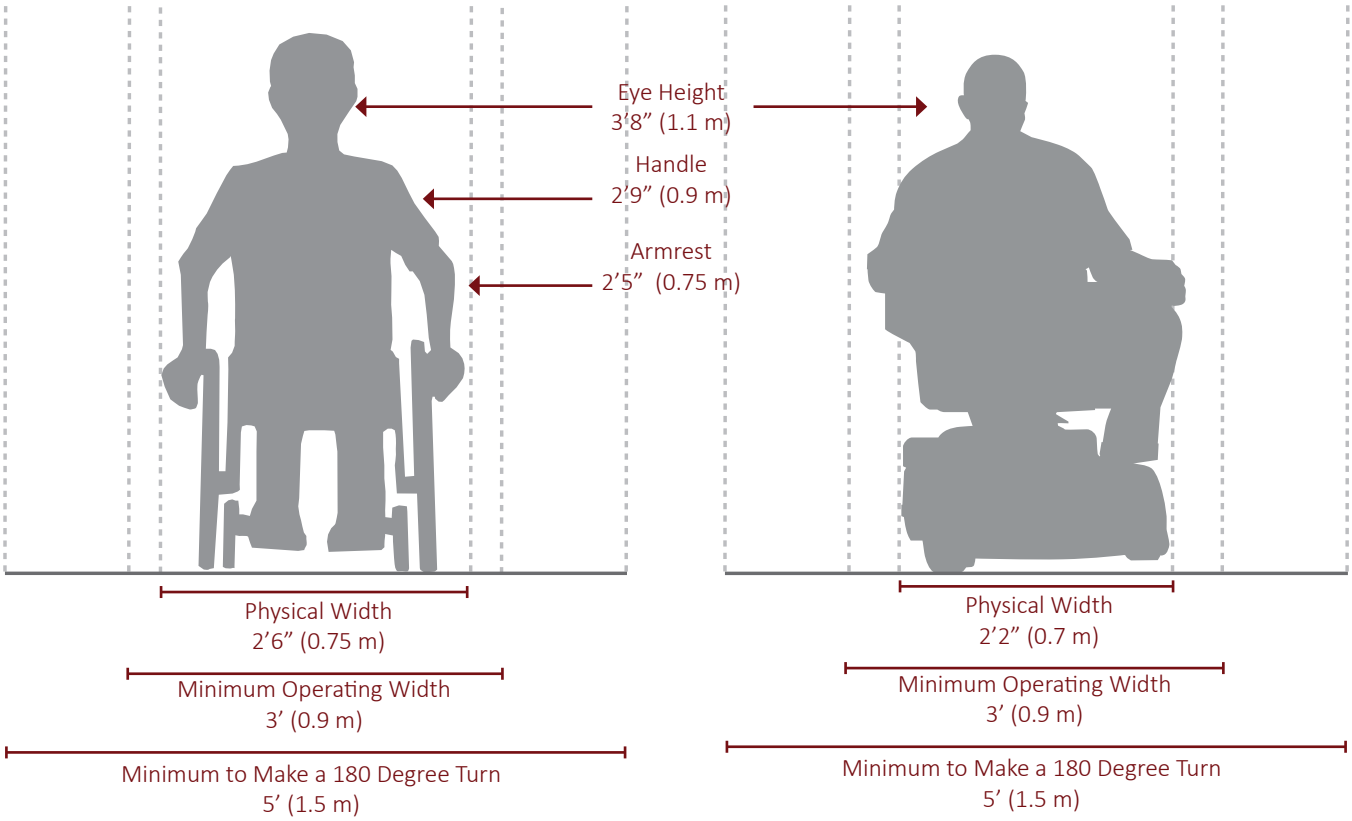
Maneuvering around a turn requires additional space for wheelchair devices. Providing adequate space for 180 degree turns at appropriate locations is an important element for accessible design.

Wheelchair User Typical Speed

User	Typical Speed
Manual Wheelchair	3.6 mph
Power Wheelchair	6.8 mph

Wheelchair User Design Considerations

Effect on Mobility	Design Solution
Difficulty propelling over uneven or soft surfaces.	Firm, stable surfaces and structures, including ramps or beveled edges.
Cross-slopes cause wheelchairs to veer downhill.	Cross-slopes of less than two percent.
Require wider path of travel.	Sufficient width and maneuvering space.



Additional References and Guidelines

FHWA. Characteristics of Emerging Road and Trail Users and Their Safety. 2004. USDOJ. 2010 ADA Standards for Accessible Design. 2010.

02: Pedestrian Facilities

Pedestrian Crossing Location and Facility Selection

Crossing Treatment Selection

The specific type of treatment at a crossing may range from a simple marked crosswalk to full traffic signals or grade separated crossings. Crosswalk lines should not typically be used by themselves, and appropriate selection of crossing enhancements should be evaluated in an engineering study. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.

Midblock Crossings

Midblock crossings are an important street design element for pedestrians. They can provide a legal crossing at locations where pedestrians want to travel, and can be safer than crossings at intersections because traffic is only moving in two directions. Locations where midblock crossings should be considered include:

- Long blocks (longer than 600 feet) with destinations on both sides of the street.
- Locations with heavy pedestrian traffic, such as schools, shopping centers.
- At midblock transit stops, where transit riders must cross the street on one leg of their journey.

PEDESTRIAN CROSSING CONTEXTUAL GUIDANCE
At unsignalized locations

	FACILITY TYPE	Local Streets 15-25 mph		Collector Streets 25-30 mph			Arterial Streets 30-45 mph							
		2 lane	3 lane	2 lane	2 lane with median refuge	3 lane	2 lane	2 lane with median refuge	3 lane	4 lane	4 lane with median refuge	5 lane	6 lane	6 lane with median refuge
1	Crosswalk Only (high visibility)	✓	✓	EJ	EJ	X	EJ	EJ	X	X	X	X	X	X
2	Crosswalk with warning signage and yield lines	EJ	✓	✓	✓	✓	EJ	EJ	EJ	X	X	X	X	X
3	Active Warning Beacon (RRFB)	X	EJ	✓	✓	✓	✓	✓	✓	X	✓	X	X	X
4	Hybrid Beacon	X	X	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓	✓	✓
5	Full Traffic Signal	X	X	EJ	EJ	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓
6	Grade separation	X	X	EJ	EJ	EJ	X	EJ	EJ	EJ	EJ	EJ	✓	✓

LEGEND	
Most Desirable	✓
Engineering Judgement	EJ
Not Recommended	X

Sidewalk Zones & Widths

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved accessibility, and the creation of social space.

Curbside Lane	Buffer Zone	Pedestrian Through Zone	Frontage Zone
The curbside lane can act as a flexible space to further buffer the sidewalk from moving traffic., and may be used for a bike lane. Curb extensions and bike corrals may occupy this space where appropriate. In the **edge zone** there should be a 6 inch wide curb.	The buffer zone, also called the furnishing or landscaping zone, buffers pedestrians from the adjacent roadway, and is also the area where elements such as street trees, signal poles, signs, and other street furniture are properly located.	The through zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects. Wide through zones are needed in downtown areas or where pedestrian flows are high.	The frontage zone allows pedestrians a comfortable "shy" distance from the building fronts. It provides opportunities for window shopping, to place signs, planters, or chairs.

Street Classification	Parking Lane/Enhancement Zone	Buffer Zone	Pedestrian Through Zone	Frontage Zone
Local Streets	Varies	4 - 6 ft	6 ft	N/A
Downtown and Pedestrian Priority Areas	Varies	4 - 6 ft	12 ft	2.5 - 10 ft
Arterials and Collectors	Varies	4 - 6 ft	6 - 8 ft	2.5 - 5 ft

Typical Application

- Wider sidewalks should be installed near schools, at transit stops, in downtown areas, or anywhere high concentrations of pedestrians exist.
- At transit stops, an 8 ft by 5 ft clear space is required for accessible passenger boarding/alighting at the front door location per ADA requirements.
- Sidewalks should be continuous on both sides of urban commercial streets, and should be required in areas of moderate residential density.
- When retrofitting gaps in the sidewalk network, locations near transit stops, schools, parks, public buildings, and other areas with high concentrations of pedestrians should be the highest priority.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Less expensive walkways constructed of asphalt, crushed stone, or other stabilized surfaces may be appropriate. Ensure accessibility and properly maintain all surfaces regularly. Surfaces must be firm, stable, and slip resistant. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Approximate Cost

Cost of standard sidewalks range from about $25 per square foot for concrete sidewalk. This cost can increase with additional right-of-way acquisition or addition of landscaping, lighting or other aesthetic features. As an interim measure, an asphalt concrete path can be placed until such time that a standard sidewalk can be built. The cost of asphalt path can be less than half the cost of a standard sidewalk.

03: Pedestrian Facilities at Intersections

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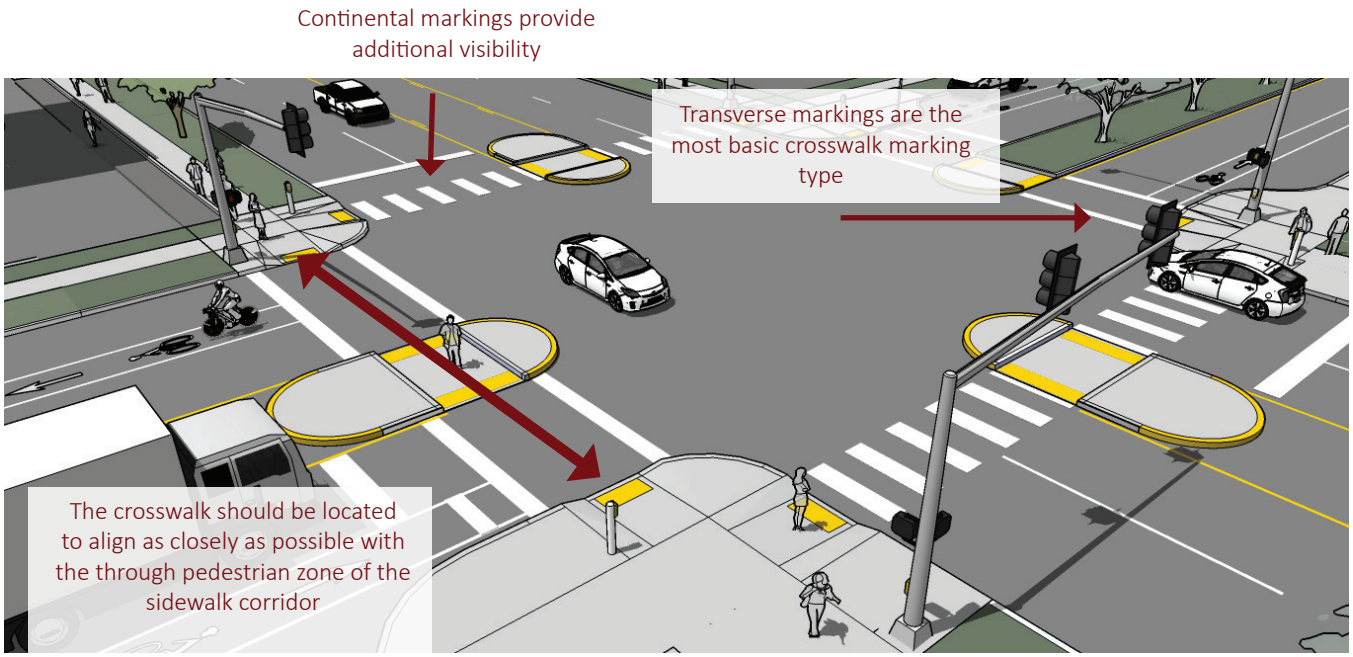
Marked Crosswalks

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer; especially on multi-lane roadways.

At mid-block locations, crosswalks must be marked to establish a legal crossing.



Typical Application

At signalized intersections, all crosswalks should be marked. At unsignalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Design Features

- Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.
- Thermoplastic markings offer increased durability than conventional paint.

Marked crosswalks at Stony Point Road and Stony Circle

Further Considerations

Pedestrians are sensitive to out-of-direction travel, and reasonable accommodations should be made to make crossings both convenient at locations with adequate visibility.

Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs. High-visibility crosswalks are not appropriate for all locations. Other crosswalk marking patterns are provided for in the CA MUTCD.

Some cities prohibit omitting or removing a marked crosswalk at intersections in order to require a three-stage pedestrian crossing. Intersections with three-stage crossings lead to arduous and increased crossing distances, pedestrian frustration, encourages jaywalking, and exhibits modal bias favoring motor vehicle level-of-service over other modes. There are circumstances when only three crosswalks are utilized and typically occur at or near interchanges and freeway ramps.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability than conventional paint.

Approximate Cost

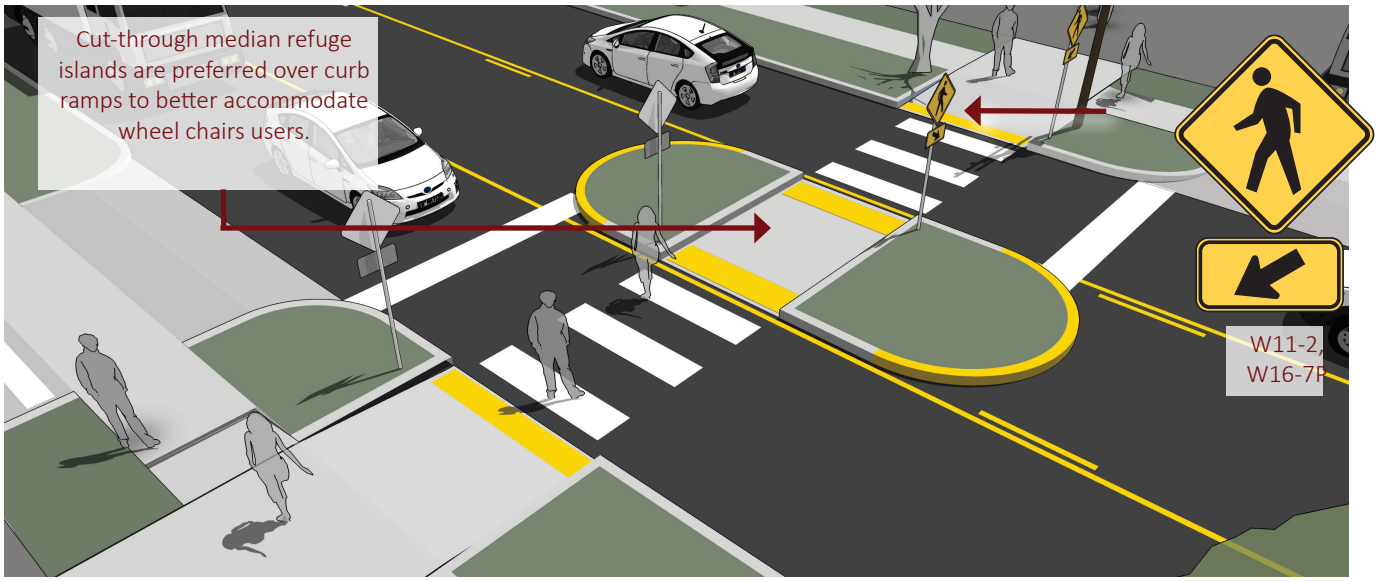
Depending on the type of material used, width of the crossing and width of the roadway, approximate installation costs are $500 for a regular striped crosswalk, $1,000 for a ladder crosswalk, and $8,000 for a patterned concrete crosswalk. In addition, the cost of a curb ramp is about $5,000-$10,000 per ramp.

Due to various number of crosswalk styles in use, signing standards, color and aesthetics, other factors will affect the final cost.

Maintenance of markings should also be considered.

Median Refuge Island

Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.



Typical Application

- Can be applied on any roadway with a left turn center lane or median that is at least 6 feet wide.
- Appropriate at signalized or unsignalized crosswalks.
- On multi-lane roadways, consider configuration with active warning beacons for improved yielding compliance.

Design Features

- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- The island should be at least 6 feet wide to be a legal refuge and be wider to accomodate cargo bikes or bikes with child trailers.
- The island should be at least 20 feet long.
- On streets with speeds higher than 25 mph there should also be double centerline marking, reflectors, and “KEEP RIGHT” signage (CA MUTCD R4-7a).
- If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 and a half feet.

Materials and Maintenance

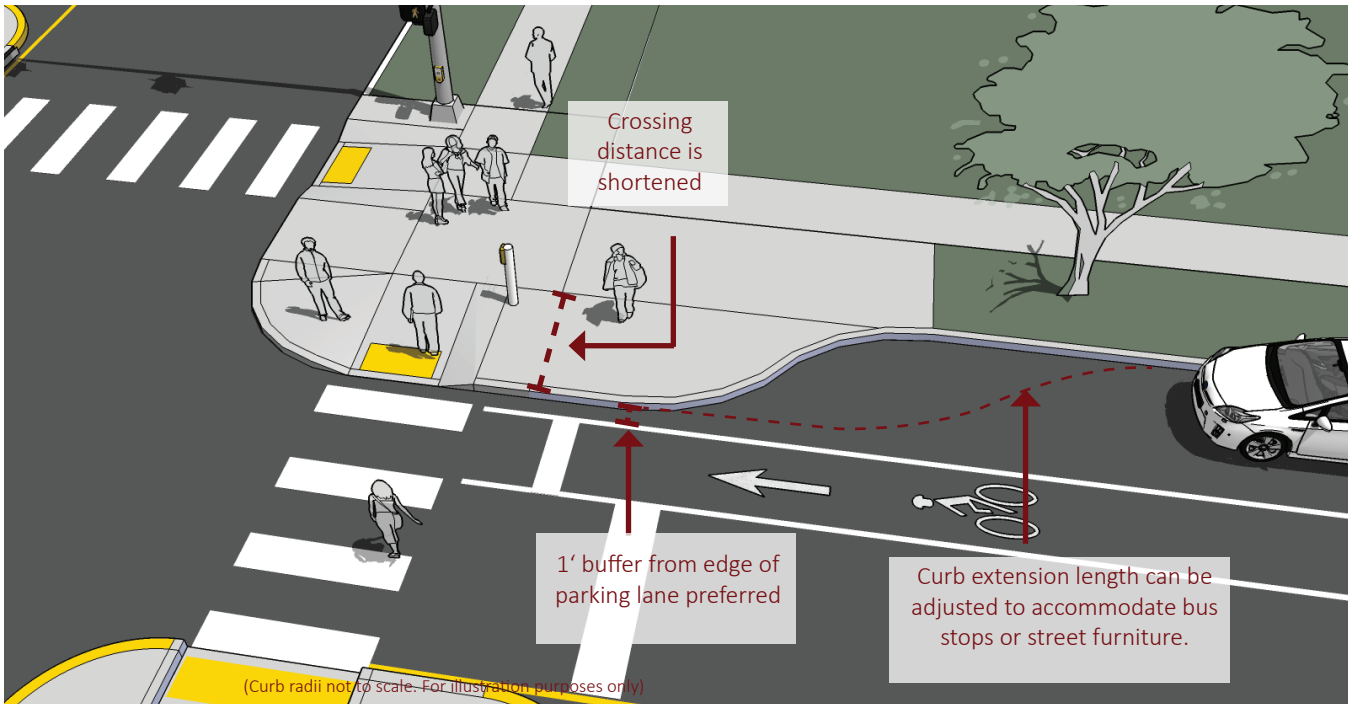
Refuge islands may require frequent maintenance of road debris. Trees and plantings in a landscaped median must be maintained so as not to impair visibility, and should be no higher than 1 foot 6 inches.

Approximate Cost

The approximate cost to install a median refuge island ranges from $500 to $1,100 per foot, or about $3,500 to $4,000, depending on the design, site conditions, landscaping, and whether the median can be added as a part of a larger street reconstruction project or utility upgrade.

Curb Extensions

Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.



Typical Application

- At signalized intersections with marked crosswalks should be marked.
- At unsignalized intersections with marked crosswalks.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Design Features

- In most cases, the curb extensions should be designed to transition between the extended curb and the running curb in the shortest practicable distance.
- For purposes of efficient street sweeping, the minimum radius for the reverse curves of the transition is 10 feet and the two radii should be balanced to be nearly equal.
- Curb extensions should terminate one foot short of the parking lane to maximize bicyclist safety.
- Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management.
- Turning performance of larger vehicles including buses may be impacted by curb extensions

Materials and Maintenance

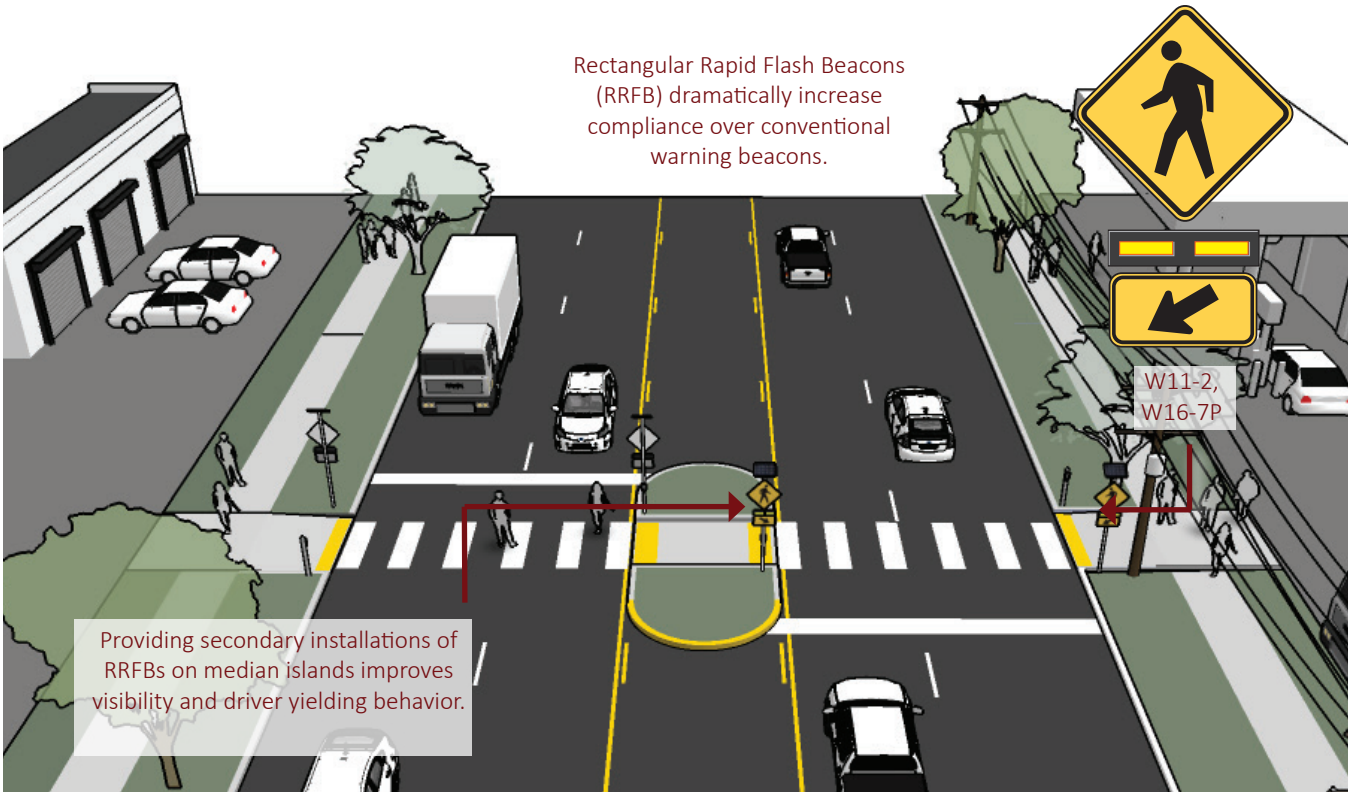
Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management. To maintain proper stormwater drainage, curb extensions can be constructed as refuge islands offset by a drainage channel or feature a covered trench drain.

Approximate Cost

The cost of a curb extension can range from $2,000 to $20,000 depending on the design and site condition, with the typical cost approximately $12,000. Green/vegetated curb extensions cost between $10,000 to $40,000.

Active Warning Beacons (RRFBs)

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).



Typical Application

- At marked crosswalks where increased pedestrian visibility is needed.
- RRFBs have the most increased compliance of all the warning beacon enhancement options. A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent.
- RRFBs are recommended as the perferred beacon treatment.

Design Features

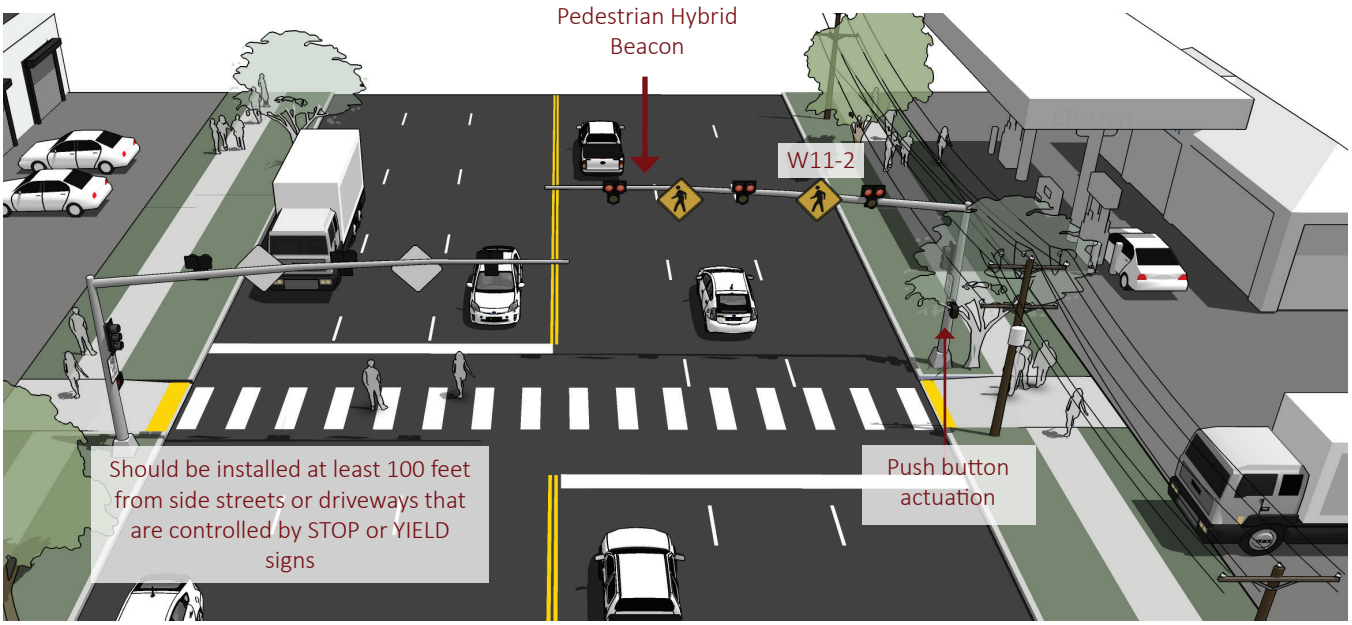
- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.

Approximate Cost

RRFBs vary in cost, depending on site conditions, but generally cost between $10,000 to $25,000 for two units.

Pedestrian Hybrid Beacons

Hybrid beacons are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal-head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk.



Typical Application

- At unsignalized intersections with high volumes of pedestrians.
- At an intersection within a school zone on a walking route.
- Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Design Features

- Hybrid beacons have less stringent warrants than full signals.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.
- Hybrid beacon signals are normally activated by push buttons, but may also be triggered by infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street
- HAWK beacons should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs. Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance. (CA MUTCD 4F)

Approximate Cost

Hybrid beacons are more expensive than other beacons, ranging in costs from $50,000 to $150,000, but are generally less expensive than full signals.

04: Bike Facilities

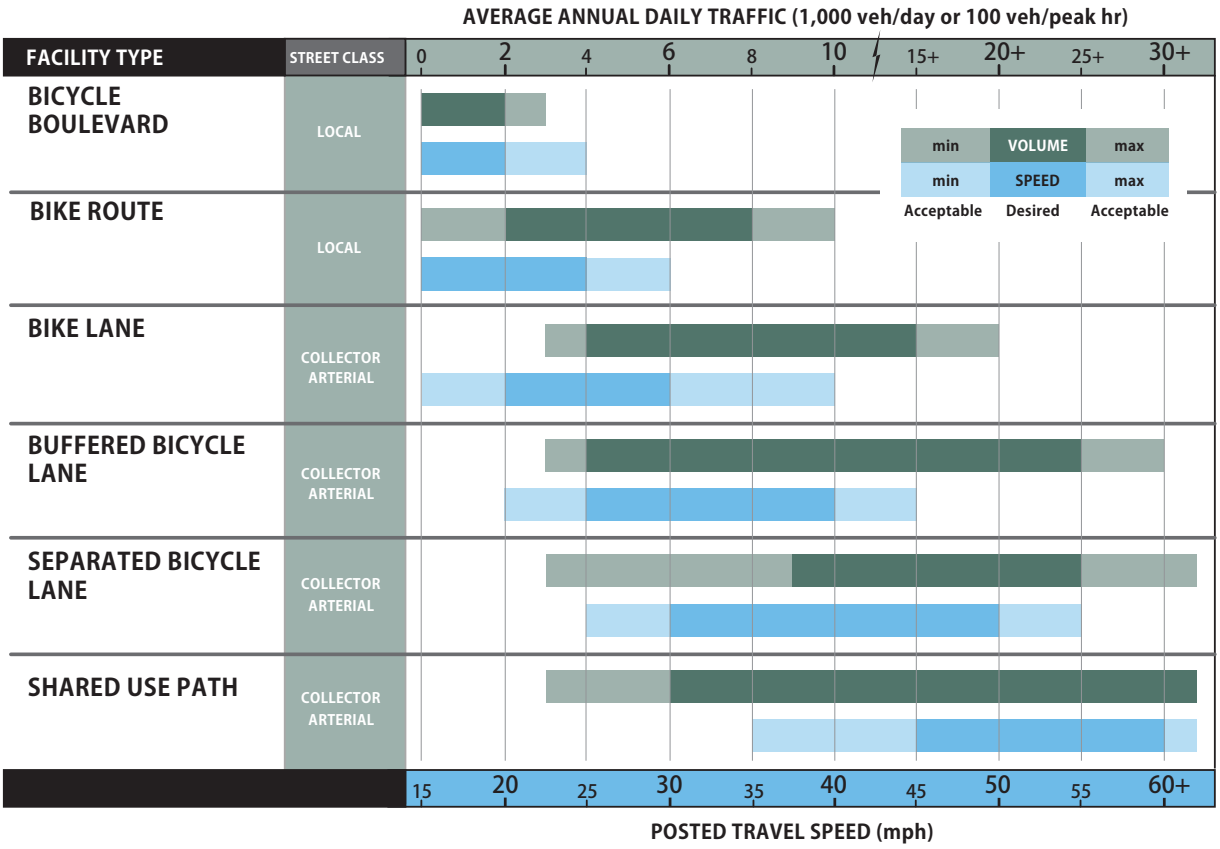
Facility Selection

Selecting the best bikeway facility type for a given roadway can be challenging, due to the range of factors that influence bicycle users' comfort and safety. There is a significant impact on bicycling comfort when the speed differential between bicyclists and motor vehicle traffic is high and motor vehicle traffic volumes are high.

Facility Selection Table

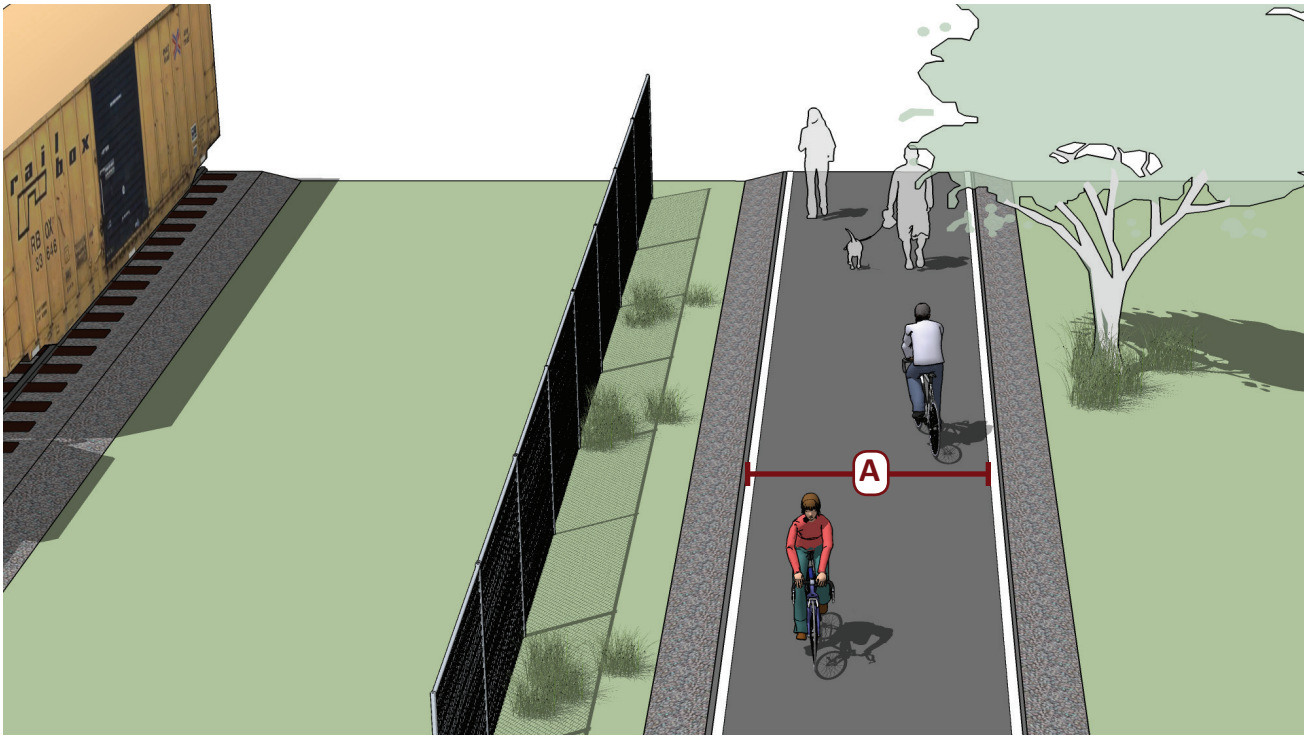
As a starting point to identify a preferred facility, the chart below can be used to determine the recommended type of bikeway to be provided in particular roadway speed and volume situations. To use this chart, identify the appropriate daily traffic volume and travel speed on or the existing or proposed roadway, and locate the facility types indicated by those key variables.

Other factors beyond speed and volume which affect facility selection include traffic mix of automobiles and heavy vehicles, the presence of on-street parking, intersection density, surrounding land use, and roadway sight distance. These factors are not included in the facility selection chart below, but should always be considered in the facility selection and design process.



Shared Use Path (Class I)

Shared use paths (Class I) are off-street facilities that can provide a desirable transportation and recreation connection for users of all skill levels who prefer separation from traffic. They often provide low-stress connections to local and regional attractions that may be difficult, or not be possible on the street network.



Typical Use

- In abandoned rail corridors (commonly referred to as Rails-to-Trails or Rail-Trails.
- In active rail corridors, trails can be built adjacent to active railroads (referred to as Rails-with-Trails.
- In utility corridors, such as powerline and sewer corridors.
- In waterway corridors, such as along canals, drainage ditches, rivers, and creeks.
- Along roadways.

Design Features

(A) 8 feet is the absolute minimum width (with 2 foot shoulders) allowed for a two-way bicycle path and is only recommended for constrained situations (Caltrans Design Manual).

- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5 foot minimum) can be provided for pedestrian use.

Lateral Clearance

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

Overhead Clearance

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

Striping

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

Prince Memorial Greenway connects users to downtown Santa Rosa. Source: Peter Stetson.

Materials and Maintenance

Shared use paths must be regularly maintained so that they are free of potholes, cracks, root lift, and debris. Signage and lighting should also be regularly maintained to ensure shared use path users feel comfortable, especially where visibility is limited.

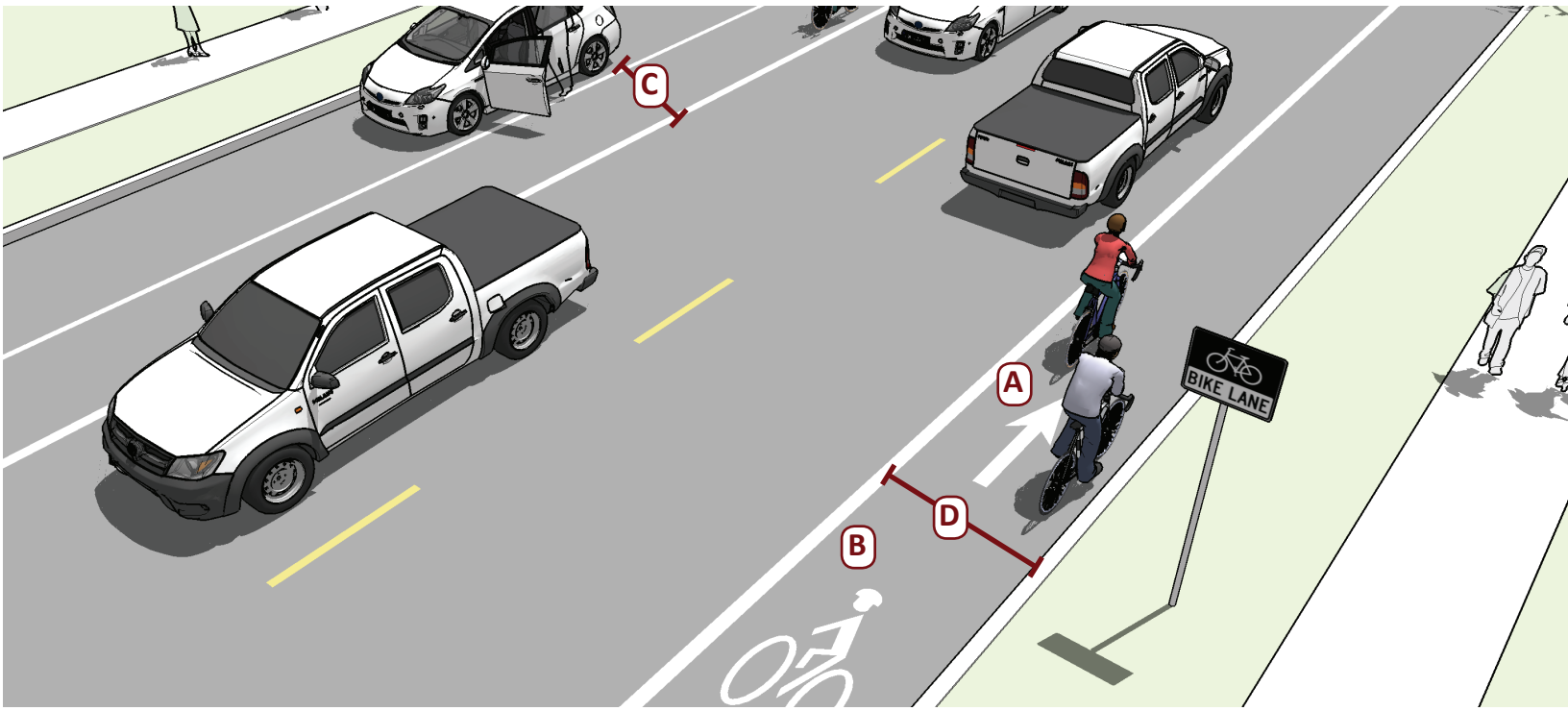
Adjacent landscaping should be regularly pruned, to allow adequate sightlines, daylight, and pedestrian-scale lighting, and so as not to obstruct the path of travel of trail users.

Approximate Cost

The cost of a shared use path can vary, but typical costs are between $65,000 per mile to $4 million per mile. These costs vary with materials, such as asphalt, concrete, boardwalk and other paving materials, lighting, and ROW acquisition.

On-Street Bicycle Lanes (Class II)

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



Typical Application

- Bike lanes may be used on any street with adequate space, but are most effective on streets with moderate traffic volumes greater than or equal to 6,000 ADT (with a greater than 3,000 ADT min.).
- Bike lanes are most appropriate on streets with low to moderate speeds of 25 mph or more.
- Appropriate for skilled adult riders on most streets.
- May be appropriate for children when configured as 6+ feet wide lanes on lower-speed, lower-volume streets with one lane in each direction.

Design Features

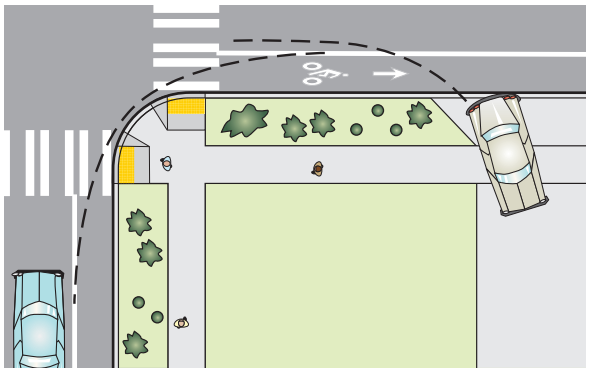
A Mark inside line with 6" stripe. Mark 4" parking lane line or "Ts".

B Include a bicycle lane marking **(MUTCD FIGURE 9C-3)** at the beginning of blocks and at regular intervals along the route (MUTCD 9C.04).

C 6 feet width preferred adjacent to on-street parking (5 feet min.).

D 5–6 feet preferred adjacent to curb and gutter (4 feet min.) or 4 feet more than the gutter pan width.

Place Bike Lane Symbols to Reduce Wear



Bike lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed outside of the motor vehicle tread path in order to minimize wear from the motor vehicle path (NACTO 2012).

Bicycle Lane

Bicycle lanes provide an exclusive space, but may be subject to unwanted encroachment by motor vehicles.

Further Considerations

- On high speed streets (greater than or equal to 40 mph) the minimum bike lane should be 6 feet.
- On streets where bicyclists passing each other is to be expected, where high volumes of bicyclists are present, or where added comfort is desired, consider providing extra wide bike lanes up to 7 feet wide, or configure as a buffered bicycle lane.
- It may be desirable to reduce the width of general purpose travel lanes in order to add or widen bicycle lanes.
- On multi-lane and/or high speed streets, the most appropriate bicycle facility to provide for user comfort may be buffered bicycle lanes or physically separated bicycle lanes.

Manhole Covers and Grates

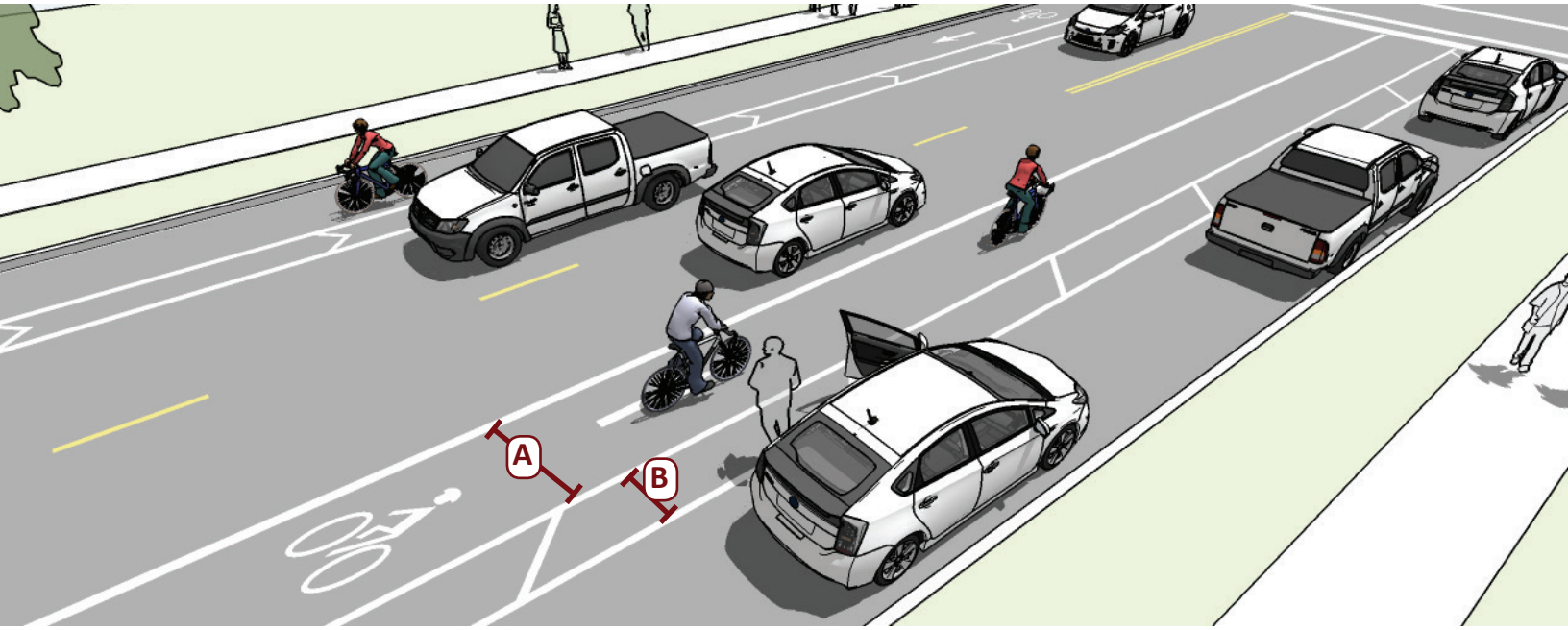
- Manhole surfaces should be manufactured with a shallow surface texture in the form of a tight, nonlinear pattern
- If manholes or other utility access boxes are to be located in bike lanes within 50 feet of intersections or within 20 feet of driveways or other bicycle access points, special manufactured permanent nonstick surfaces will be required to ensure a controlled travel surface for cyclists breaking or turning.
- Manholes, drainage grates, or other obstacles should be set flush with the paved roadway. Roadway surface inconsistencies pose a threat to safe riding conditions for bicyclists. Construction of manholes, access panels or other drainage elements will be constructed with no variation in the surface. The maximum allowable tolerance in vertical roadway surface will be 1/4 of an inch.

Approximate Cost

The cost for installing bicycle lanes will depend on the implementation approach. Typical costs are $16,000 per mile for restriping.

Buffered Bicycle Lanes (Class II)

Buffered bike lanes (Class II) are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.



Typical Application

- Anywhere a conventional bike lane is being considered.
- On streets with high speeds and high volumes or high truck volumes.
- On streets with extra lanes or lane width.
- Appropriate for skilled adult riders on most streets.

Design Features

(A) The minimum bicycle travel area (not including buffer) is 5 feet wide.

(B) Buffers should be at least 2 feet wide. If buffer area is 4 feet or wider, white chevron or diagonal markings should be used (CA MUTCD 9C-104).

- For clarity at driveways or minor street crossings, consider a dotted line.
- There is no standard for whether the buffer is configured on the parking side, the travel side, or a combination of both.

Buffered Bicycle Lanes

The use of pavement markings delineates space for cyclists to ride in a comfortable facility.

The use of pavement markings delineates space for cyclists to ride in a comfortable facility.

Further Considerations

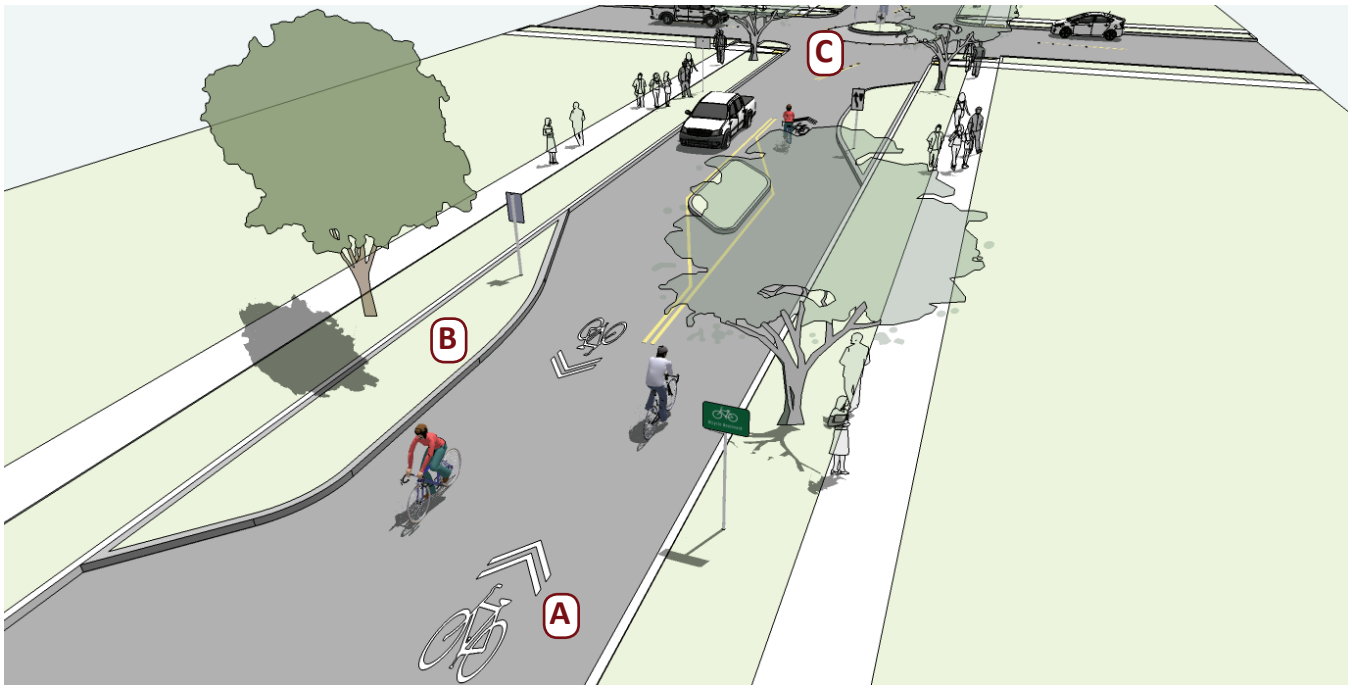
- Color may be used within the lane to discourage motorists from entering the buffered lane.
- A study of buffered bicycle lanes found that, in order to make the facilities successful, there needs to also be driver education, improved signage and proper pavement markings.
- On multi-lane streets with high vehicles speeds, the most appropriate bicycle facility to provide for user comfort may be physically separated bike lanes.
- NCHRP Report #766 recommends, when space in limited, installing a buffer space between the parking lane and bicycle lane where on-street parking is permitted rather than between the bicycle lane and vehicle travel lane.

Approximate Cost

The cost for installing buffered bicycle lanes will depend on the implementation approach. Typical costs are $16,000 per mile for restriping. However, the cost of large-scale bicycle treatments will vary greatly due to differences in project specifications and the scale and length of the treatment.

Bicycle Boulevards (Class III)

Bicycle boulevards (Class III) are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.



Typical Application

- Parallel with and in close proximity to major thoroughfares (1/4 mile or less).
- Follow a desire line for bicycle travel that is ideally long and relatively continuous (2-5 miles).
- Avoid alignments with excessive zigzag or circuitous routing. The bikeway should have less than 10 percent out of direction travel compared to shortest path of primary corridor.
- Streets with travel speeds at 25 mph or less and with traffic volumes of fewer than 3,000 vehicles per day.

Design Features

A Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.

B Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.

C Intersection crossings should be designed to enhance safety and minimize delay for bicyclists and pedestrians.

Bicycle Boulevards

Bicycle boulevards are established on streets that improve connectivity to key destinations and provide a direct, low-stress route for bicyclists, with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority over other modes.

Traffic Calming

Neighborhood bikeways may require additional traffic calming measures to discourage through trips by motor vehicles.

Further Considerations

- Bicycle boulevards are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists and pedestrians, these intersections can become major barriers along the bicycle boulevard and compromise safety.

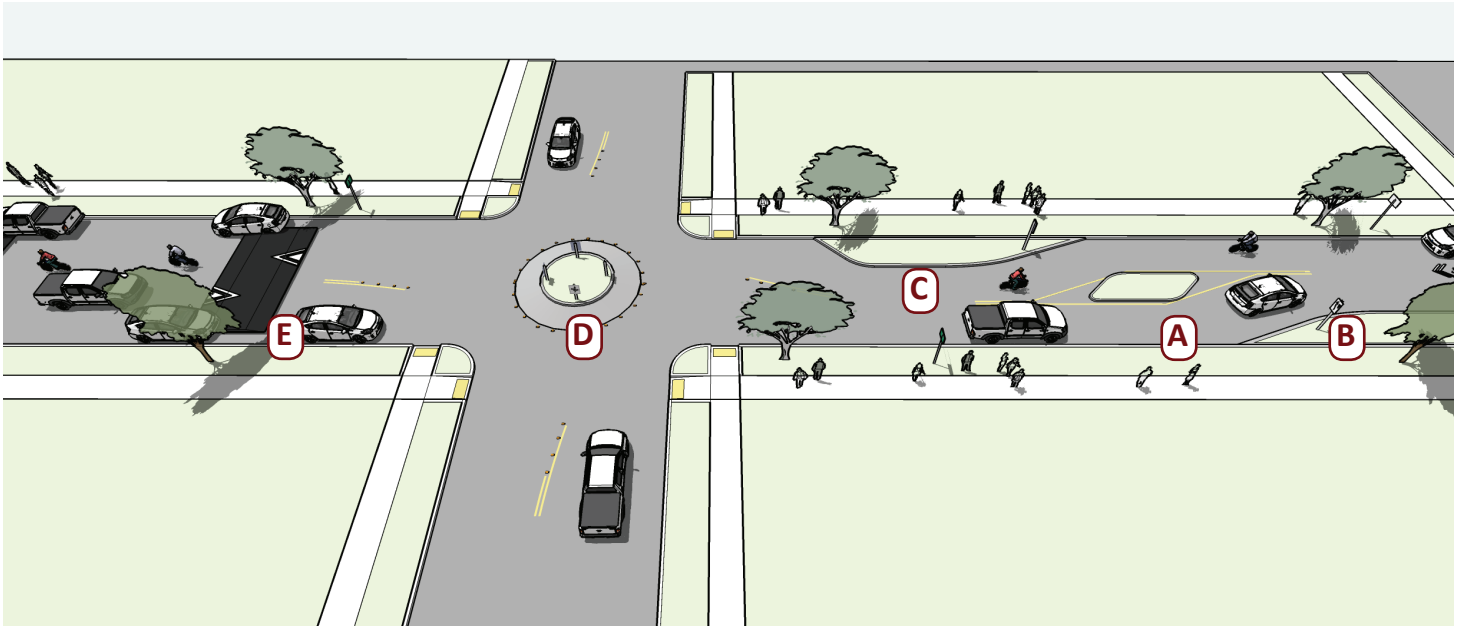
- Traffic calming can lower speeds along bicycle boulevards and even deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Approximate Cost

Costs vary depending on the type of treatments proposed for the corridor. Simple treatments such as wayfinding signage and markings are most cost-effective, but more intensive treatments will have greater impact at lowering speeds and volumes, at a higher cost.

Traffic Calming for Bike Boulevards

Traffic calming may include elements intended to reduce the speeds of motor vehicle traffic to be closer to bicyclist travel speeds, or may include designelements that restrict certain movements for motorized travelto discourage the use of bicycle boulevardcorridors for through travel by automobiles.Traffic calming treatments can cause drivers to slow down by constricting the roadway space or by requiring careful maneuvering. Such measures may reduce the design speed of a street, and can be used in conjunction with reduced speed limits to reinforce the expectation of lowered speeds.They can also lower vehicle volumes by physically or operationally reconfiguring corridors and intersections along the route.



Typical Application

- Bicycle boulevardsshould have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 20 mph (25 mph maximum). Bikeways with average speeds above this limit should be considered for traffic calming measures.
- Maintain a minimum clear width of 14 feet with a constricted length of at least 20 feet in the direction of travel.
- Bring traffic volumes down to 1,500 cars per day (4,000 cars per day maximum). Bikeways with daily volumes above this limit should be considered for traffic calming measures.

Design Features (Speed Reduction)

A Median islands create pinchpoint for traffic in the center of the roadway and offers shorter crossing distances for pedestrians when used in tandem with a marked crossing.

B Chicanes slow drivers by requiring vehicles to shift laterally through narrowed lanes and which avoids uninterrupted sightlines.

C Pinchpoints, chokers, or curb extensions restrict motorists from operating at high speeds on local streets by visually narrowing the roadway.

D Neighborhood traffic circles reduce speed of traffic at intersections by requiring motorists to move cautiously through conflict points.

E Street trees narrow a driver's visual field, subconsiously queing drivers to slow down.

- Speed humps slow drivers through vertical deflection. To minimize impacts to bicycles, use a sinusoidal profile and leave a gap along curb so that bicyclists may bypass the hump when appropriate. Speed cushions operate in a similar fashion to speed humps, but allow for unimpeded travel by emergency vehicles.

Design Features (Volume Reduction)

- Partial closure diverters allows bicyclists to proceed straight across the intersection but forces motorists to turn left or right. All turns from the major street onto the bikeway are prohibited. Can incorporate curb extensions with stormwater management features and/ora mountable island.

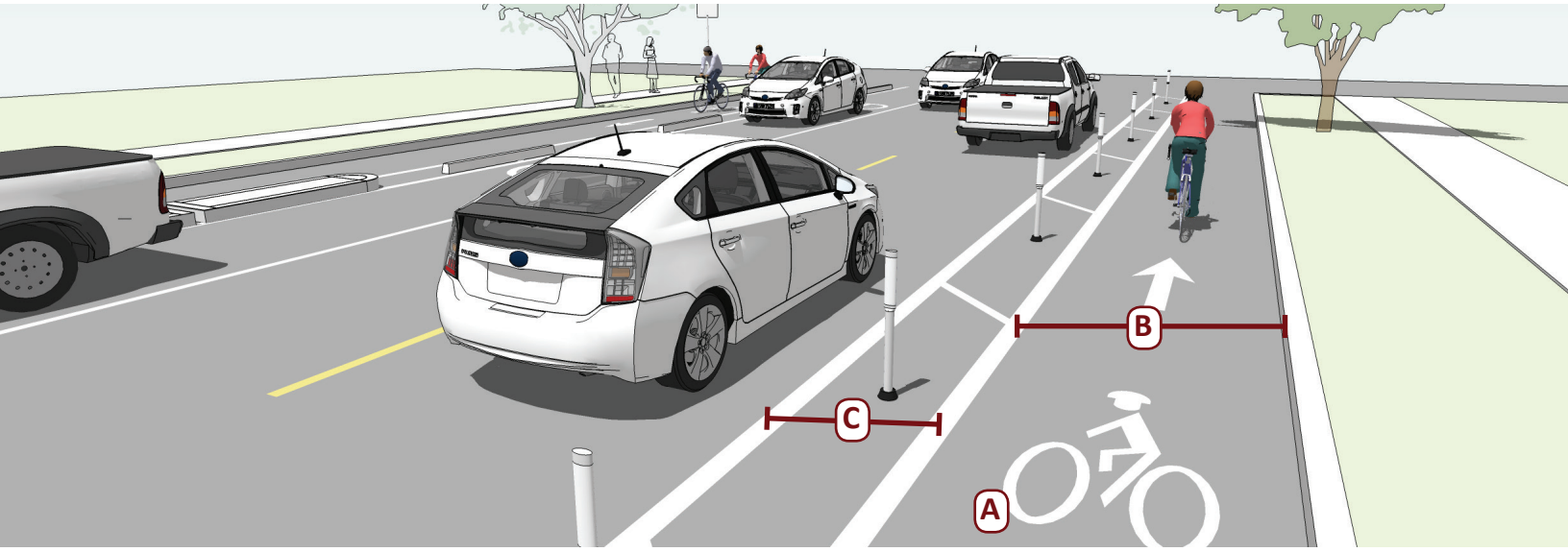
- Right-in/right-out diverters forcemotorists to turn right while bicyclists can continue straight through the intersection. The island can provide a through bike lane or bicycle access to reduce conflicts withright-turning vehicles. Left turns from the major street onto the bikeway are prohibited, while right turns are still allowed.

- Median refuge island diverters restrict through and left-turn vehicle movements along the bikeway while providing refuge for bicyclists to cross one direction of traffic at a time. This treatment prohibits left turns from the major street onto the bikeway, while right turns are still allowed.

- Full diverters blockall motor vehicles from continuing on a neighborhood bikeway, while bicyclists can continue unrestricted. Full closures can be constructed to be permeable to emergency vehicles.

One-Way Separated Bike Lanes (Class IV)

When retrofitting separated bike lanes onto existing streets, a one-way street-level design may be most appropriate. This design provides protection through physical barriers and can include flexible delineators, curbs, on-street parking or other barriers. A street level separated bike lane shares the same elevation as adjacent travel lanes..



Typical Application

- Street retrofit projects with limited funds for relating curbs and drainage.
- Streets with high motor vehicle volumes and/or speeds and high bicycle volumes.
- Streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments.
- Appropriate for most riders on most streets.

Design Features

(A) Pavement markings, symbols and/or arrow markings must be placed at the beginning of the separated bike lane and at intervals along the facility (MUTCD 9C.04).

(B) 7 foot width preferred to allow passing (5 foot minimum).

(C) 3 foot minimum buffer width adjacent to parking. 18 inch minimum adjacent to travel lanes. Channelizing devices should be placed in the buffer area (NACTO, 2012).

- If buffer area is 4 feet or wider, white chevron or diagonal markings should be used.

Street Level Separated Bicycle Lanes can be separated from the street with parking, planters, bollards, or other design elements.

Further Considerations

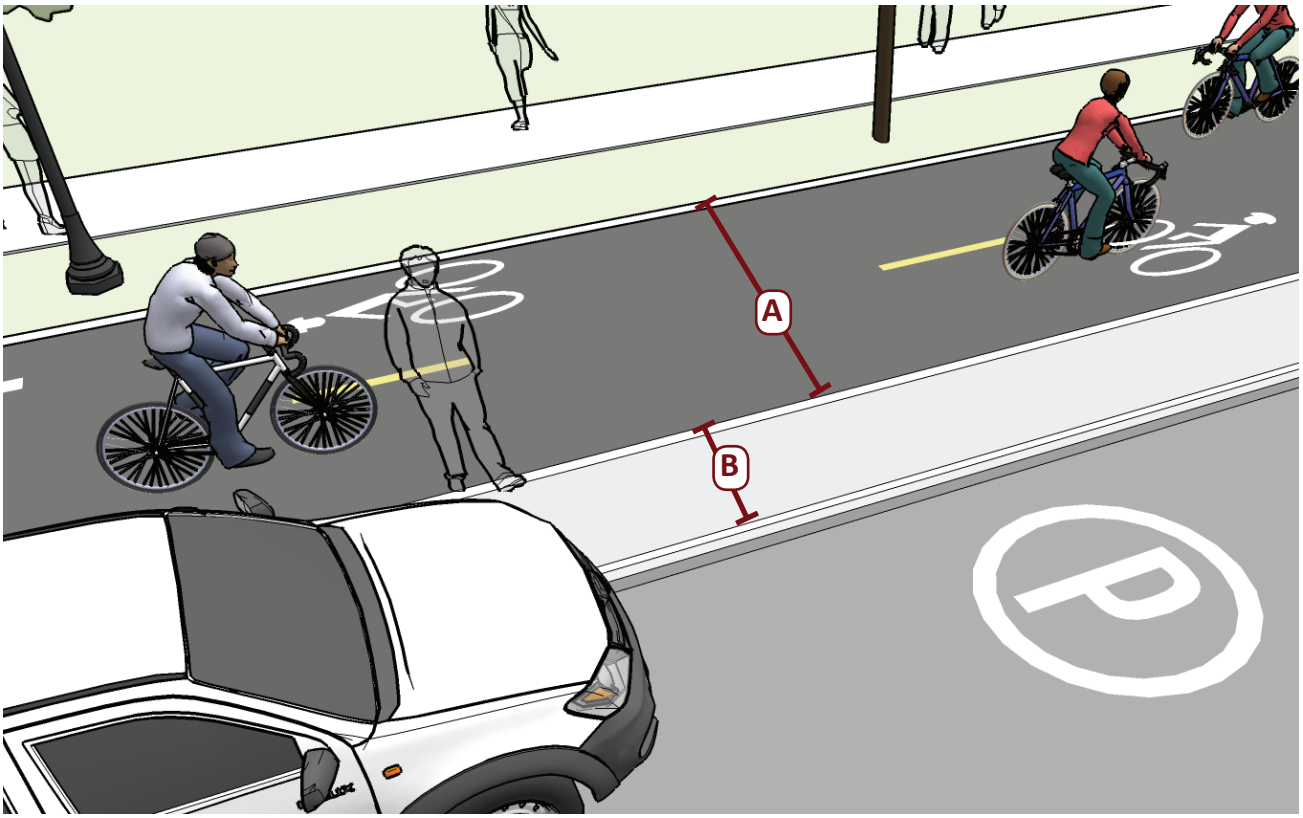
- Separated bike lane buffers and barriers are covered in the MUTCD as preferential lane markings (section 3D.01) and channelizing devices (section 3H.01). Curbs may be used as a channeling device, see the section on islands (section 3I.01).
- A retrofit separated bike lane has a relatively low implementation cost compared to road reconstruction by making use of existing pavement and drainage and by using parking lane as a barrier.
- Gutters, drainage outlets and utility covers should be designed and configured as not to impact bicycle travel.
- Special consideration should be given at transit stops to manage bicycle and pedestrian interactions.

Approximate Cost

The implementation cost is low if the project uses existing pavement and drainage, but the cost significantly increases if curb lines need to be moved. A parking lane is the low-cost option for providing a barrier. Other barriers might include concrete medians, bollards, tubular markers, or planters.

Two-Way Separated Bike Lanes (Class IV)

Two-Way Separated Bikeways are bicycle facilities that allow bicycle movement in both directions on one side of the road. Two-way separated bikeways share some of the same design characteristics as one-way separated bikeways, but often require additional considerations at driveway and side-street crossings, and intersections with other bikeways.



Typical Use

- Works best on the left side of one-way streets.
- Streets with high motor vehicle volumes and/or speeds
- Streets with high bicycle volumes.
- Streets with a high incidence of wrong-way bicycle riding.
- Streets with few conflicts such as driveways or cross-streets on one side of the street.
- Streets that connect to shared use paths.

Design Features

A 12 foot operating width preferred (10 ft minimum) width for two-way facility.

- In constrained locations an 8 foot minimum operating width may be considered (HDM 1003.1(1)).

B Adjacent to on-street parking a 3 foot minimum width channelized buffer or island shall be provided to accommodate opening doors (NACTO, 2012) (CA MUTCD 3H.01, 3I.01).

- A separation narrower than 5 feet may be permitted if a physical barrier is present (AASHTO, 2013).
- Additional signalization and signs may be necessary to manage conflicts.

Two-Way Separated Bikeway

A two-way facility can accommodate cyclists in two directions of travel.

Further Considerations

- On-street bikeway buffers and barriers are covered in the CA MUTCD as preferential lane markings (section 3D.01) and channelizing devices, including flexible delineators (section 3H.01). Curbs may be used as a channeling device, see the section on islands (section 3I.01).
- A two-way separated bikeway on one way street should be located on the left side.
- A two-way separated bikeway may be configured at street level or as a raised separated bikeway with vertical separation from the adjacent travel lane.
- Two-way separated bikeways should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.
- See Caltrans Design Information Bulletin No. 89 for more details.

Materials and Maintenance

Bikeway striping and markings will require higher maintenance where vehicles frequently traverse over them at intersections, driveways, parking lanes, and along curved or constrained segments of roadway. Green conflict striping (if used) will also generally require higher maintenance due to vehicle wear.

Bikeways should be maintained so that there are no pot holes, cracks, uneven surfaces or debris.

Access points along the facility should be provided for street sweeper vehicles to enter/exit the separated bikeway.

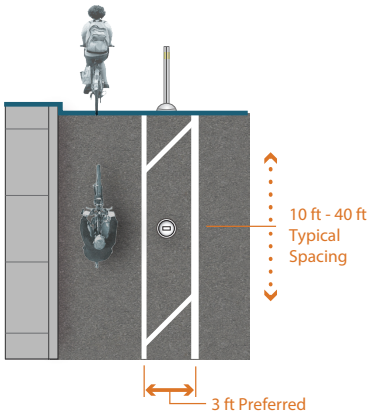
Approximate Cost

Separated bikway construction costs can vary drastically depending on the type of separation used, the amount of new curb and gutter, stormwater mitigation, and crossing treatments. On the lower end of the scale, construction of a striped parking protected bikeway with delineators or other vertical elements can cost as little as $15,000-$30,000 per mile.

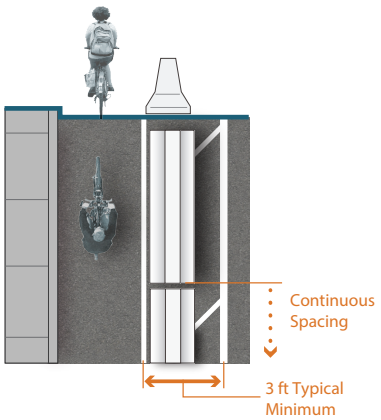
Separation Methods

Separated bikeways may use a variety of vertical elements to physically separate the bikeway from adjacent travel lanes. Barriers may be robust constructed elements such as curbs, or may be more interim in nature, such as flexible delineator posts.

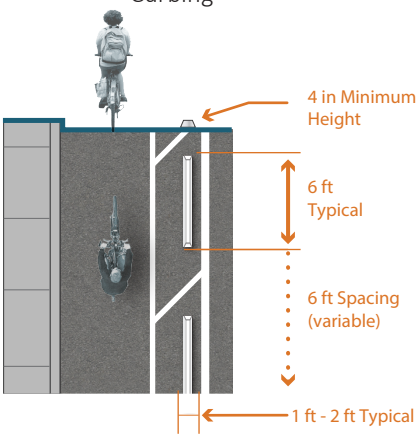
Delineator Posts



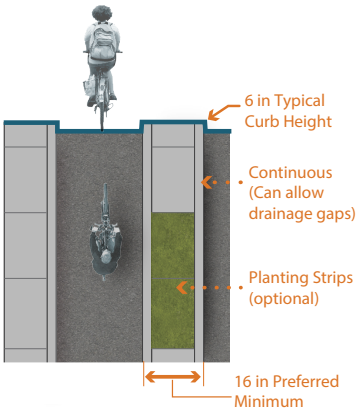
Concrete Barrier



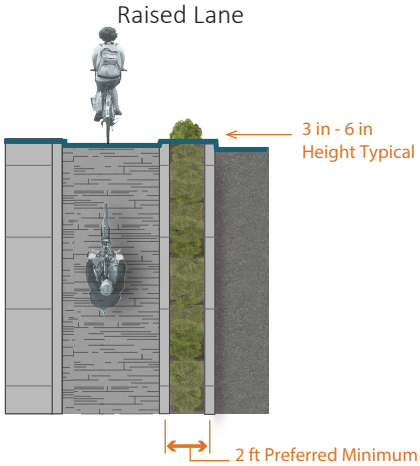
Curbing



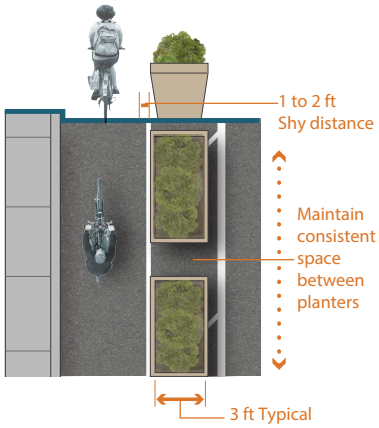
Median



Raised Lane



Planters



Typical Application

Appropriate barriers for retrofit projects:

- Parked Cars
- Flexible delineators
- Bollards
- Planters
- Parking stops

Appropriate barriers for reconstruction projects:

- Curb separation
- Medians
- Landscaped Medians
- Raised separated bike lane with vertical or mountable curb
- Pedestrian Safety Islands

BIKEWAY SEPARATION METHODS

Raised separated bikeways are bicycle facilities that are vertically separated from motor vehicle traffic.

Design Features

- Maximize effective operating space by placing curbs or delineator posts as far from the through bikeway space as practicable.
- Allow for adequate shy distance of 1 to 2 feet from vertical elements to maximize useful space.
- When next to parking allow for 3 feet of space in the buffer space to allow for opening doors and passenger unloading.
- The presences of landscaping in medians, planters and safety islands increases comfort for users and enhances the streetscape environment.

Further Considerations

- Separated bikeway buffers and barriers are covered in the MUTCD as preferential lane markings (section 3D.01) and channelizing devices (section 3H.01). Curbs may be used as a channeling device, see the section on islands (section 3I.01).
- With new roadway construction a raised separated bikeway can be less expensive to construct than a wide or buffered bicycle lane because of shallower trenching and sub base requirements.
- Parking should be prohibited within 30 feet of the intersection to improve visibility.

04: Bicycle Facilities at Intersections

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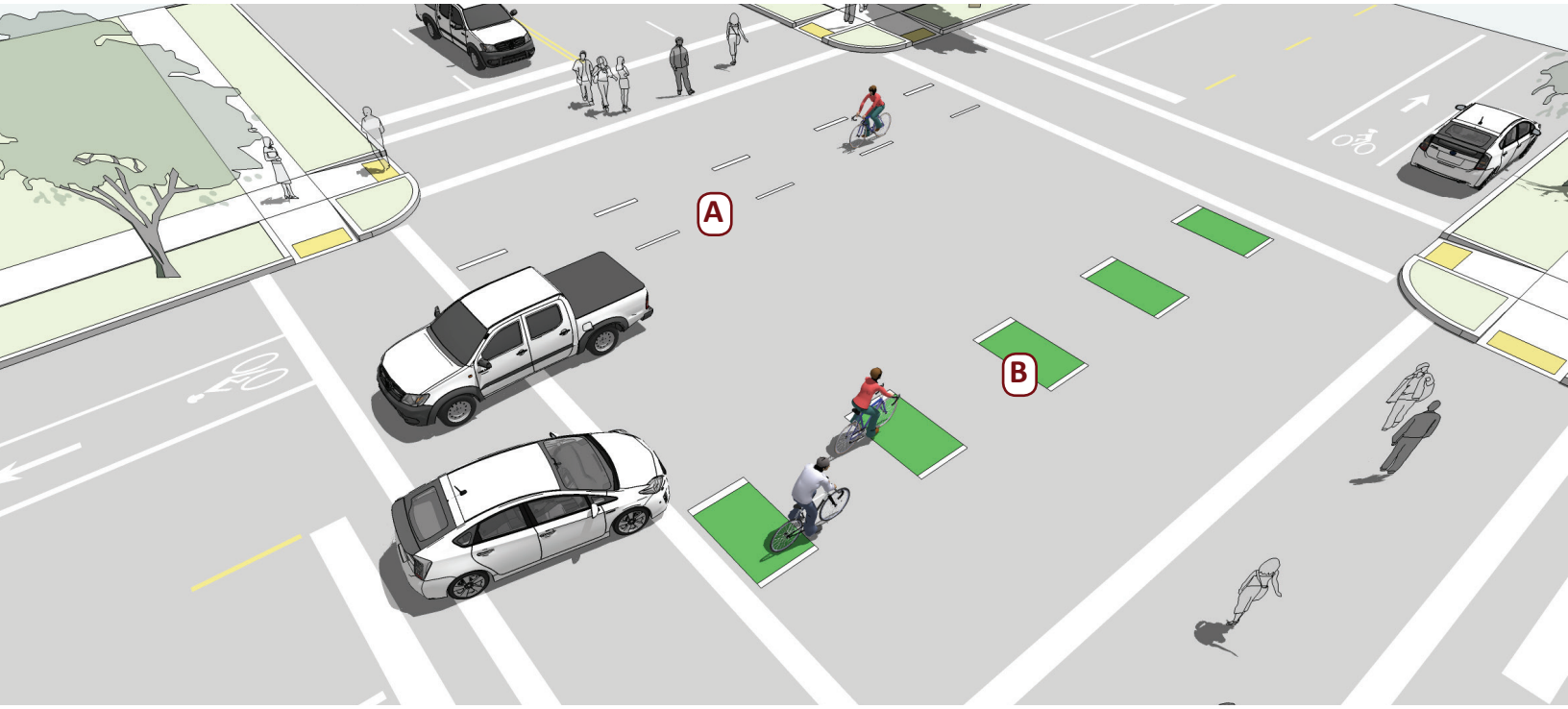
Intersection Crossing Markings

Bicycle pavement markings through intersections guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and vehicles in the adjacent lane.



Typical Application

- Streets with conventional, buffered, or separated bike lanes.
- At direct paths through intersections.
- Streets with high volumes of adjacent traffic.
- Where potential conflicts exist between through bicyclist and adjacent traffic.

Design Features

A Intersection markings should be the same width and in line with leading bike lane.

- Dotted lane line extensions should be 2 foot line segments with 2 to 6 foot gaps between them (CAMUTCD 3B.08).
- All markings should be white, skid resistant and retro reflective (CAMUTCD 9C.02.02).

B Dotted lines may be enhanced with solid green, or dashed green with the same extents as the gotted line itself.

Intersection Crossing Markings

Intersection crossing markings can be used at signalized intersections or high volume minor street and driveway crossings.

Further Considerations

The National Committee on Uniform Traffic Control Devices has submitted a request to include additional options for bicycle lane extensions through intersections as a part of future MUTCD updates. Their proposal includes the following options for striping elements within the crossing:

- Bicycle lane markings
- Double chevron markings, indicating the direction of travel.
- Green colored pavement.

Approximate Cost

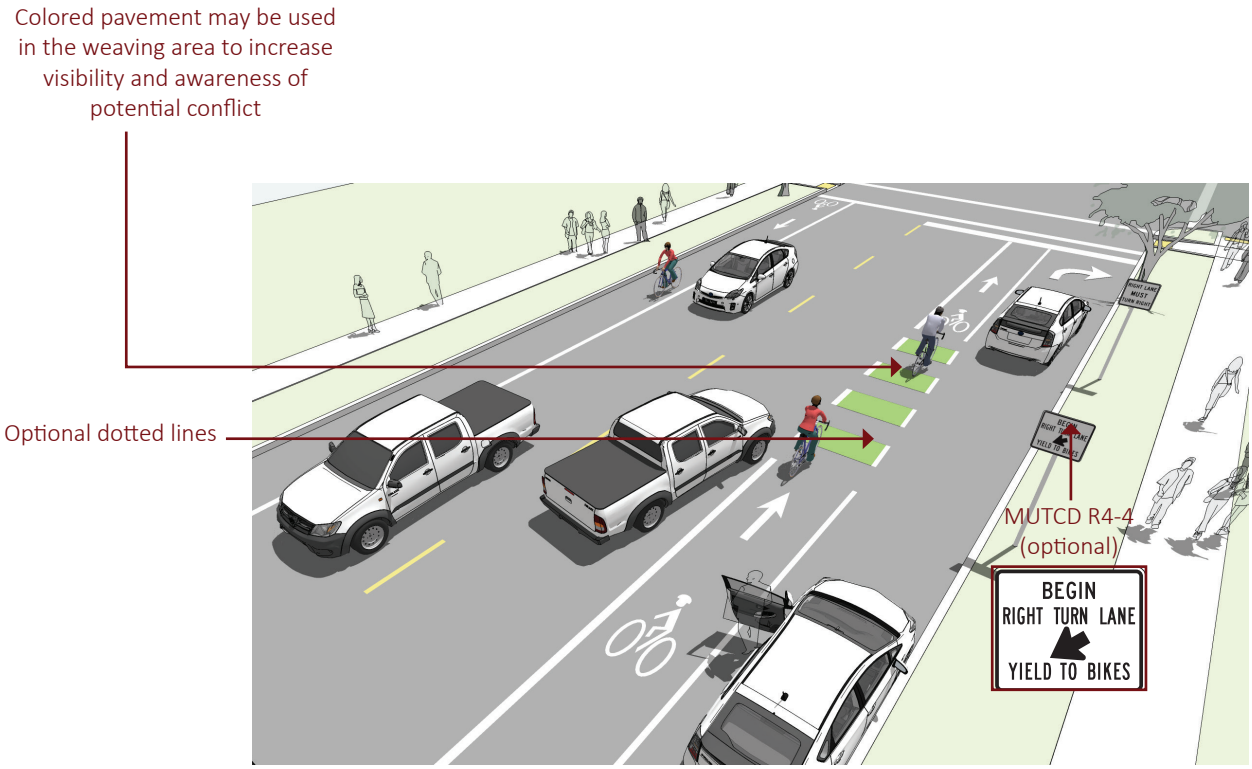
The cost for installing intersection crossing markings will depend on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when provided as part of routine overlay or repaving projects.

Typical thermoplastic shared lane markings cost $180 each.

Bike Lanes at Right Turn Lanes

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

The design (below) illustrates conflict markings, with signage indicating that motorists should yield to bicyclists through the conflict area.



Design Features

At auxiliary right turn only lanes (add lane):

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using colored conflict areas to promote visibility of the mixing zone.

Where a through lane becomes a right turn only lane:

- Do not define a dotted line merging path for bicyclists.
- Drop the bicycle lane in advance of the merge area.
- Use shared lane markings to indicate shared use of the lane in the merging zone.

Materials and Maintenance

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

Drivers wishing to enter the right turn lane must transition across the bicycle lane in advance of the turn.

Further Considerations

- The bicycle lane maintains a straight path, and drivers must weave across, providing clear right-of-way priority to bicyclists.
- Maintaining a straight bicycle path reinforces the priority of bicyclists over turning cars. Drivers must yield to bicyclists before crossing the bike lane to enter the turn lane.
- Through lanes that become turn only lanes are difficult for bicyclists to navigate and should be avoided.
- The use of dual right-turn-only lanes should be avoided on streets with bike lanes (AASHTO, 2013). Where there are dual right-turn-only lanes, the bike lane should be placed to the left of both right-turn lanes; however, this merge is uncomfortable for most bicyclists. Keeping the bike lane to the right of the turn lanes is possible if a bicycle signal phase is implemented to separate bicyclists from turning vehicles.

Materials and Maintenance

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

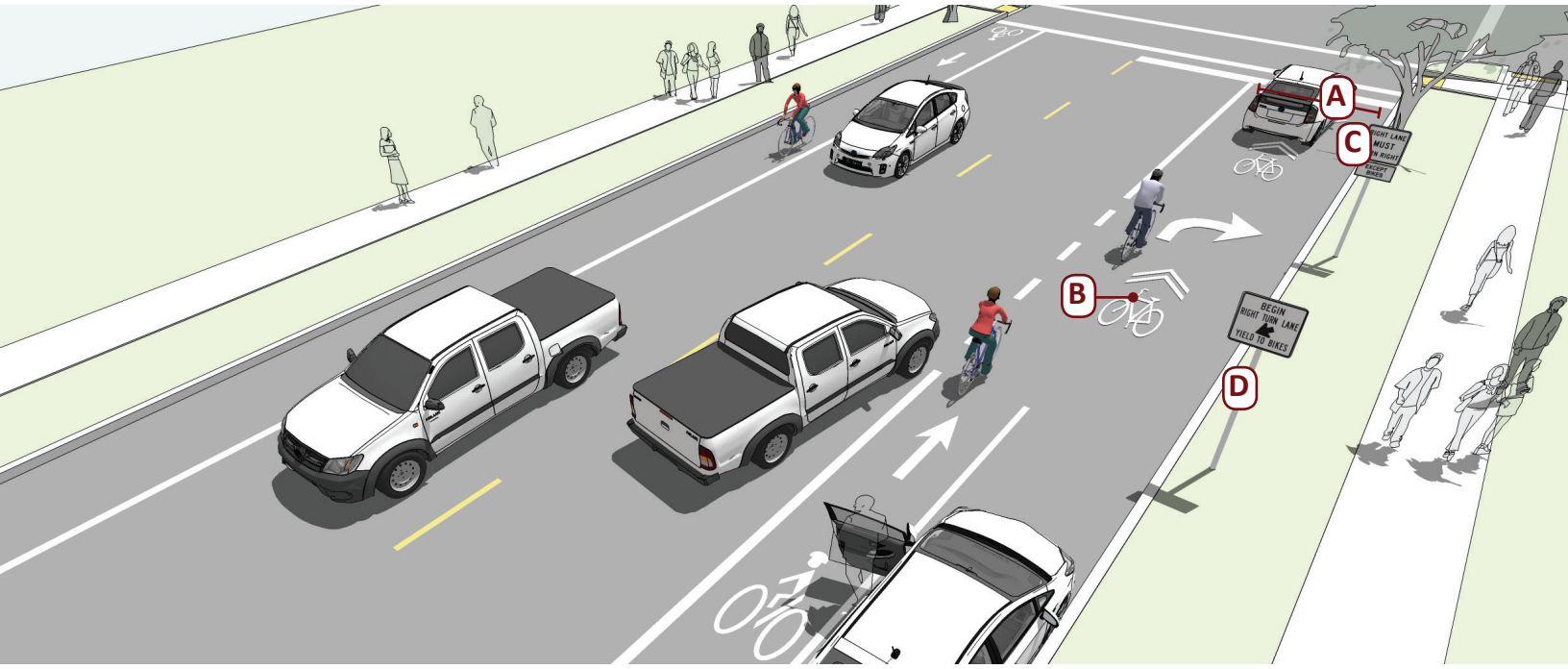
Approximate Cost

The cost for installing bicycle lanes will depend on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when provided as part of routine overlay or repaving projects.

Typical costs are $16,000 per mile for restriping.

Combined Bike Lane/Turn Lane

Where there isn't room for a conventional bicycle lane and turn lane a combined bike lane/turn lane creates a shared lane where bicyclists can ride and turning motor vehicles yield to through traveling bicyclists. The combined bicycle lane/turn lane places shared lane markings within a right turn only lane.



Typical Application

- Most appropriate in areas with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less).
- May not be appropriate for high speed arterials or intersections with long right turn lanes.
- May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Design Features

(A) Maximum shared turn lane width is 13 feet; narrower is preferable (NACTO, 2012).

(B) Shared Lane Markings should indicate preferred positioning of bicyclists within the combine lane.

(C) A "Right Lane Must Turn Right" (CA MUTCD R3-7R) sign with an "EXCEPT BIKES" plaque may be needed to permit through bicyclists to use a right turn lane.

(D) Use "Begin Right Turn Lane Yield To Bikes" signage (CA MUTCD R4-4) to indicate that motorists should yield to bicyclists through the conflict area.

- There should be a receiving bicycle lane or shoulder on the far side of the intersection

Combined Bike Lane/Turn Lane (Billings, MT)

Shared lane markings and signs indicate that bicyclists should right in the left side of this right turn only lane.

Further Considerations

- This treatment is recommended at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.
- Not recommended at intersections with high peak motor vehicle right turn movements.
- Combined bike lane/turn lane creates safety and comfort benefits by negotiating conflicts upstream of the intersection area.

Materials and Maintenance

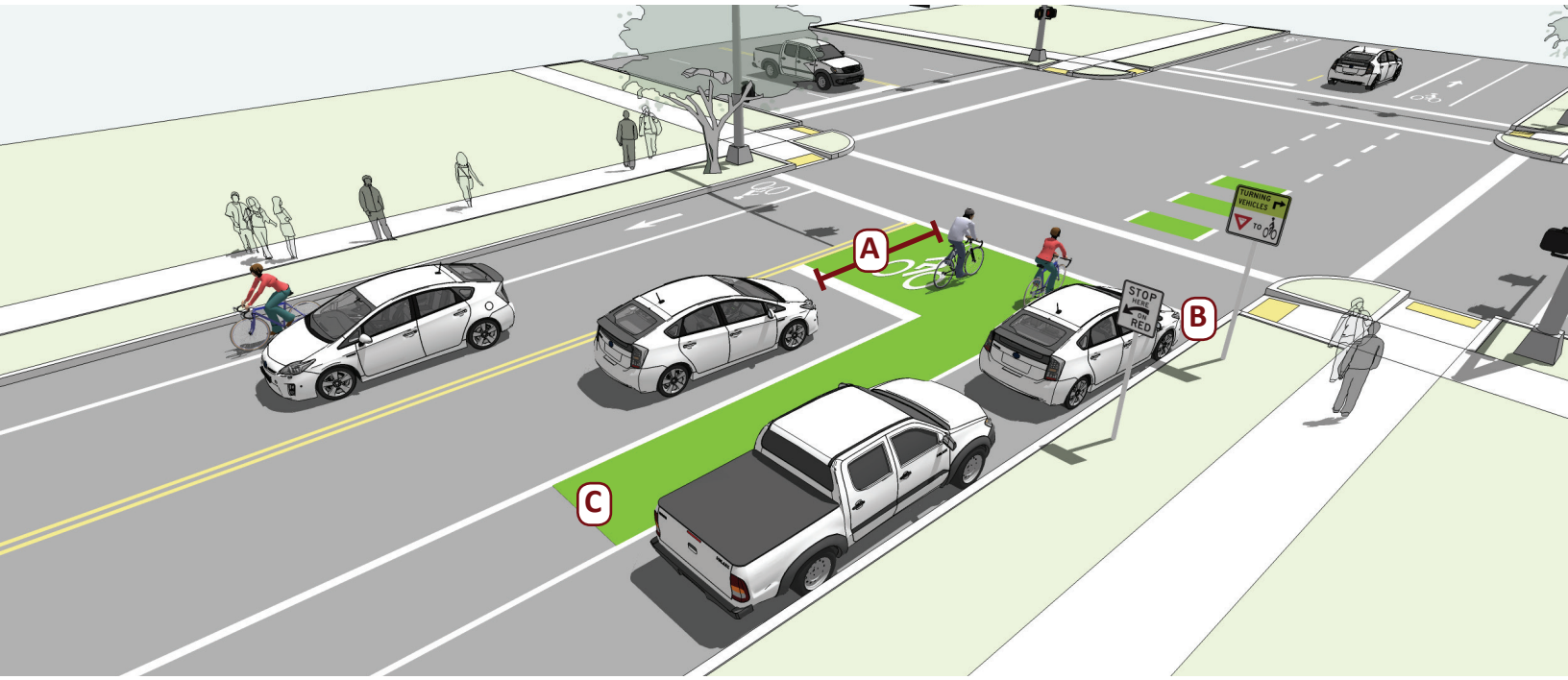
Because the effectiveness of markings depends entirely on their visibility, maintaining the visibility of markings should be a high priority.

Approximate Cost

- The cost for installing a combined bike/turn lane will depend on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when provided as part of routine overlay or repaving projects. Some roadways can be retrofitted with simple shared lane markings and accompanying signage.

Bike Box

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



Typical Application

- At potential areas of conflict between bicyclists and turning vehicles, such as a right or left turn locations.
- At signalized intersections with high bicycle volumes.
- At signalized intersections with high vehicle volumes.

Design Features

A 14 foot minimum depth from back of crosswalk to motor vehicle stop bar (NACTO, 2012).

B A "No Turn on Red" (MUTCD R10-11) sign shall be installed overhead to prevent vehicles from entering the Bike Box. A "Stop Here on Red" (MUTCD R10-6) sign should be post mounted at the stop line to reinforce observance of the stop line.

- A 50 foot ingress lane should be used to provide access to the box.

C Use of green colored pavement is optional but recommended.

Bike Box

A bike box allows for cyclists to wait in front of queuing traffic, providing high visibility, and a head start over motor vehicle traffic.

Further Considerations

- This treatment positions bicycles together and on a green signal, all bicyclists can quickly clear the intersection, minimizing conflict and delay to transit or other traffic.
- Pedestrians also benefit from bike boxes, as they experience reduced vehicle encroachment into the crosswalk.
- Two stage turn boxes are better treatments to facilitate bicycle turns as they are available for queing during a parallel green signal indication.

Materials and Maintenance

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

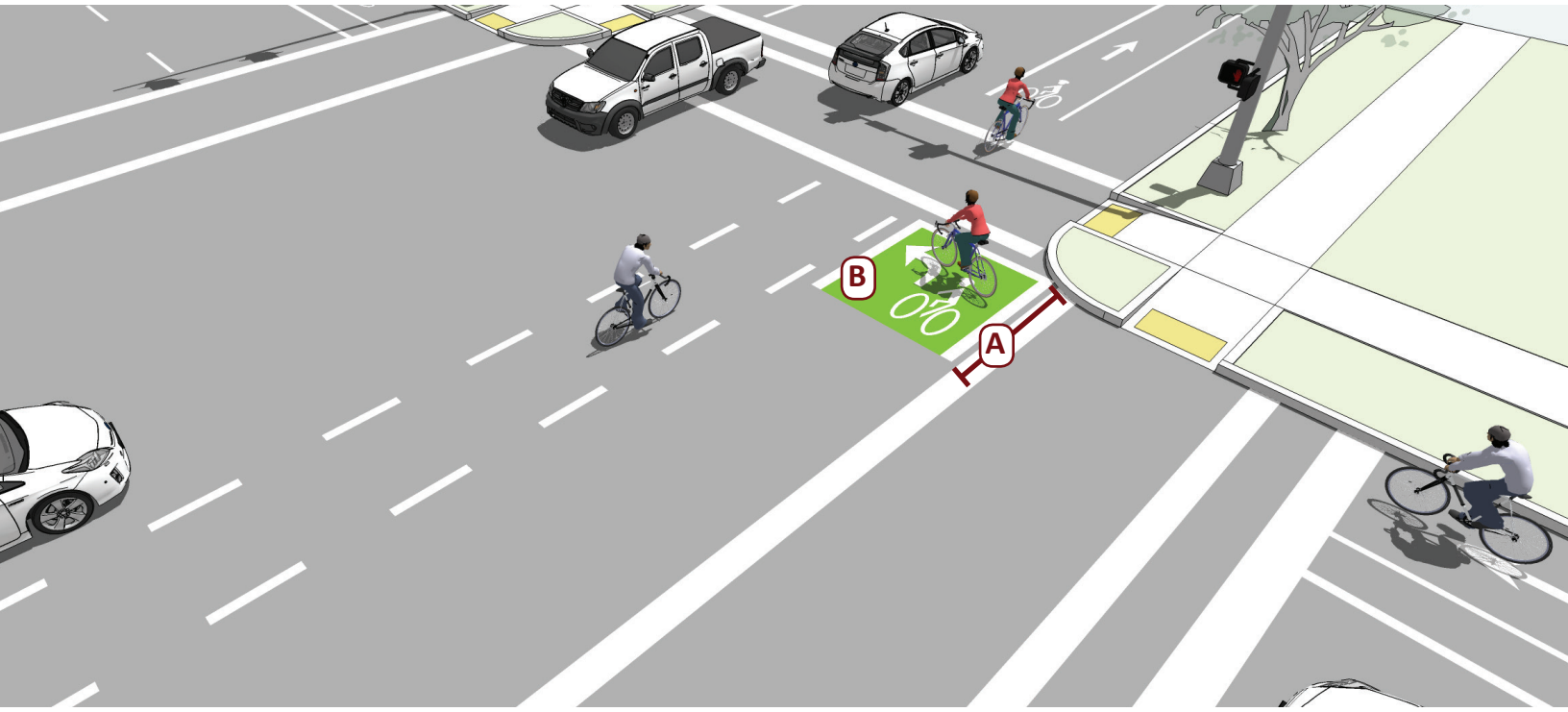
Approximate Cost

Costs will vary due to the type of paint used and the size of the bike box, as well as whether the treatment is added at the same time as other road treatments.

The typical cost for painting a bike box is $11.50 per sq. foot.

Two-Stage Turn Boxes

Two- stage turn boxes offer bicyclists a safe way to make turns at multi-lane signalized intersections from a physically separated or conventional bike lane. On physically separated bike lanes, bicyclists are often unable to merge into traffic to turn due to physical separation, making the provision of two-stage turn boxes critical.



Typical Application

- Streets with high vehicle speeds and/or traffic volumes.
- At intersections locations of multi-lane roads with signalized intersections.
- At signalized intersections with a high number of bicyclists making a left turn from a right side facility.

Design Features

- The two-stage turn box shall be placed in a protected area. Typically this is within the shadow of an on-street parking lane or separated bike lane buffer area and should be placed in front of the crosswalk to avoid conflict with pedestrians.

(A) 6.5 feet deep by 10 feet wide is the required minimum dimensions of the box to accommodate three bicyclists side by side (FHWA).

(B) Bicycle stencil and turn arrow pavement markings shall be used to indicate proper bicycle direction and positioning (NACTO, 2012).

Jughandle Turn Box

This MUTCD compliant design carves a jughandle out of the sidewalk to provide space for waiting bicyclists.

Separated Bike Lane Turn Box

On separated bike lanes, the two-stage turn box can be located in the protected buffer/parking area.

Further Considerations

- Provide a "No Turn on Red" sign (MUTCD R10-11) on the cross street if turning vehicles come into conflict with the placement of the turn box.
- This design formalizes a maneuver called a "box turn" or "pedestrian style turn."
- Design guidance for two-stage turns apply to both bike lanes and separated bike lanes.
- Two-stage turn boxes reduce conflicts in multiple ways; from keeping bicyclists from queuing in a bike lane or crosswalk and by separating turning bicyclists from through bicyclists.
- Bicyclist capacity of a two-stage turn box is influenced by physical dimension (how many bicyclists it can contain) and cycle length (how frequently the box clears).
- More information on two stage turn boxes is available:
    - FHWA Separated Bike Lane Planning and Design Guide
    - NACTO. Urban Bikeway Design Guide. 2012
    - FHWA Interim Approval-20

Materials and Maintenance

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

Approximate Cost

Costs will vary due to the type of paint used and the size of the two-stage turn box, as well as whether the treatment is added at the same time as other road treatments.

The typical cost for painting a two-stage turn box is $11.50 per square foot.

Bicycle Detection and Actuation

At fully signalized intersections, bicycle crossings are typically accomplished through the use of a standard green signal indication for Class II and III bikeways. A number of traffic signal enhancements can be made to improve detection and actuation and better accommodate bicyclists. An exclusive bicycle phase provided by bicycle signals offers the highest level of service and protection, especially for Class I and IV bikeways, but feature the same detection and actuation devices used at intersections with standard traffic signals. For more information on bicycle signals, see Protected Bicycle Signal Phase.

Typical Application

- Bicycle detection and actuation is used to alert the signal controller of bicycle crossing demand on a particular approach. Proper bicycle detection should meet at least two primary criteria: 1) accurately detect bicyclists, and 2) provide clear guidance to bicyclists on how to actuate detection (e.g. what button to push or where to stand). Additionally, new technologies are being developed to provide feedback to bicyclists once they have been detected to increase the likelihood of stop compliance.
- Detection mechanisms can also provide bicyclists with an extended green time before the signal turns yellow so that bicyclists of all abilities can reach the far side of the intersection.
- All new or modified traffic signals in California must be equipped for bicyclist detection, or be placed on permanent recall or fixed time operation (CalTrans Traffic Operations Policy Directive 09-06).
- Detection shall be place where bicyclists are intended to travel and/or wait.
- On bicycle priority corridors with on-street bike lanes or separated bikeways, consider the use of advance detection placed 100-200 feet upstream of the intersection to provide an early trigger to the signal system and reduce bicyclist delay.

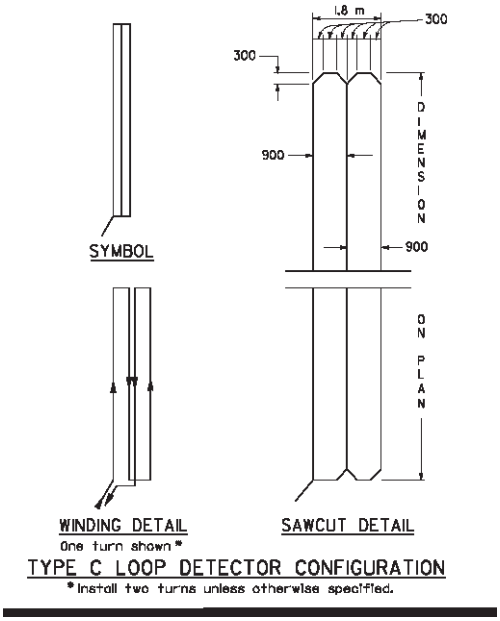
Design Features

- Bicycle detection and actuation systems include user-activated buttons mounted on a pole facing the street, in-pavement loop detectors that trigger a change in the traffic signal when a bicycle is detected, video detection cameras that use digital image processing to detect a change in the image at a location, and/or Remote Traffic Microwave Sensor Detection (RTMS) which uses frequency modulated continuous wave radio signals to detect objects in the roadway.
- 6 foot by 6 foot Type C loop conductors should be used.
- A linear pavement marking should be used to indicate where cyclists should stand to acuate the signal.
- Signal heads should depict green, yellow, and red cyclist icons to communicate when the exclusive bicycle phase is in progress.

Push Button Actuation

Bicycle push button actuators are positioned to allow bicycle riders in roadway to stop traffic on busy cross-streets.

Type C Loop Detector



Type C loop detector have been shown to most reliably detect bicyclists at all points over their surface.

Further Considerations

- The location of pushbuttons should not require bicyclists to dismount or be rerouted out of the way or onto the sidewalk to activate the phase. Signage should supplement the signal to alert bicyclists of the required activation to prompt the green phase.
- In-pavement Type C Loop detectors are induction circuits installed within the roadway surface to detect bicyclists as they wait for the signal. This allows the bicyclists to stay within the lane of travel. Loop detectors should be sufficiently sensitive to detect bicyclists and be marked with pavement markings instructing bicyclists on where to stand. CAMUTCD provides guidance on stencil markings and signage related to loop detectors.
- Remote Traffic Microwave Sensor Detection (RTMS) is unaffected by temperature and lighting which can affect standard video detection.
- Bicyclists typically need more time to travel through an intersection than motor vehicles. Green light times should be determined using the bicycle crossing time for standing bicycles.

Materials and Maintenance

Bicycle signal detection equipment should be inspected and maintained regularly, especially if detection relies on manual actuation. Pushbuttons and loop detectors will tend to have higher maintenance needs than other passive detection equipment.

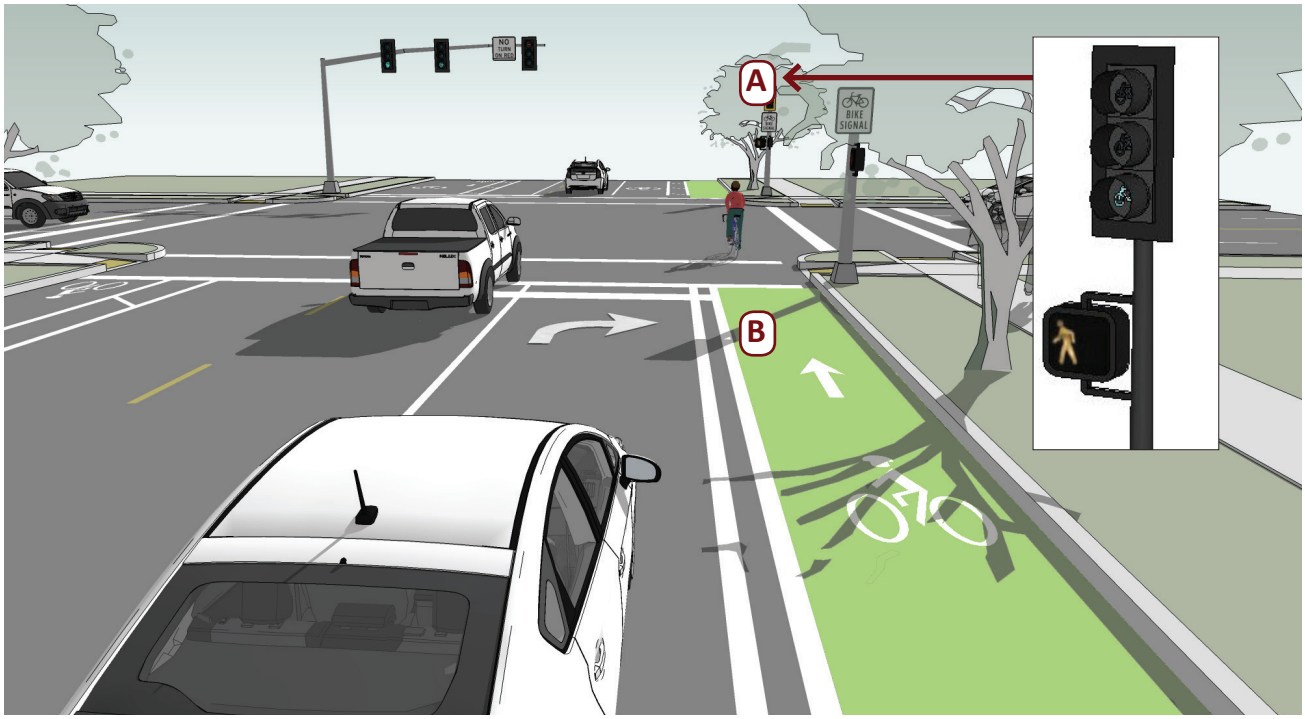
Approximate Cost

Costs vary depending on the type of technology used, but bicycle loop detectors embedded in the pavement typically cost from $1,000-$2,000. Video detection camera systems typically range from $20,000 to $30,000 per intersection.

Other traffic signal programming enhancements can be made to existing traffic signal hardware with relatively little to no additional hardware costs.

Separated Bicycle Signal Phase

Separated bicycle lane crossings of signalized intersections can be accomplished through the use of a bicycle signal phase which reduces conflicts with motor vehicles by separating bicycle movements from any conflicting motor vehicle movements. Bicycle signals are traditional three lens signal heads with green, yellow and red bicycle stenciled lenses.



Typical Use

- Two-way protected bikeways where contraflow bicycle movement or increased conflict points warrant protected operation.
- Bicyclists moving on a green or yellow signal indication in a bicycle signal shall not be in conflict with any simultaneous motor vehicle movement at the signalized location
- Right (or left) turns on red should be prohibited in locations where such operation would conflict with a green bicycle signal indication.

Design Features

A An additional “Bicycle Signal” sign should be installed below the bicycle signal head.

B Designs for bicycles at signalized crossings should allow bicyclists to trigger signals via pushbutton, loop detectors, or other passive detection, to navigate the crossing.

- On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists (CA MUTCD 9D.02).

A bicycle signal head at a signalized crossing creates a protected phase for cyclists to safely navigate an intersection.

A bicycle detection system triggers a change in the traffic signal when a bicycle is detected.

Further Considerations

- A bicycle signal should be considered for use only when the volume/collision or volume/geometric warrants have been met (CA MUTCD 4C.102).
- The Federal Highway Administration (FHWA) has approved bicycle signals for use, if they comply with requirements from Interim Approval 16 (I.A. 16). Bicycle Signals are not approved for use in conjunction with Pedestrian Hybrid Beacons.
- Bicyclists typically need more time to travel through an intersection than motor vehicles. Green light times should be determined using the bicycle crossing time for standing bicycles.
- Bicycle detection and actuation systems include user-activated buttons mounted on a pole, loop detectors that trigger a change in the traffic signal when a bicycle is detected and video detection cameras, that use digital image processing to detect a change in the image at a location.

Materials and Maintenance

Bicycle signal detection equipment should be inspected and maintained regularly, especially if detection relies on manual actuation. Pushbuttons and loop detectors will tend to have higher maintenance needs than other passive detection equipment.

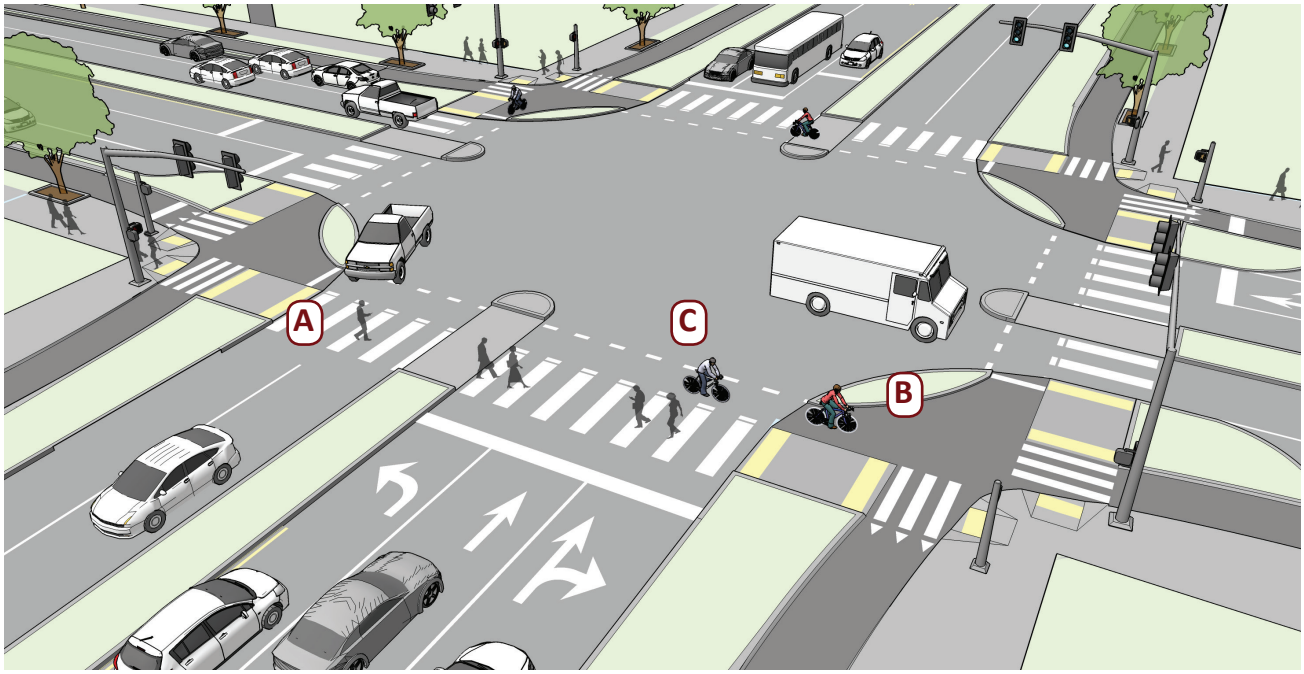
Approximate Cost

Bicycle signal heads have an average cost of $12,800.

Video detection camera system costs range from $15,000 to $25,000 per intersection.

Protected Intersection

A protected intersection, or “Bend Out” uses a collection of intersection design elements to maximize user comfort within the intersection and promote a high rate of motorists yielding to people bicycling. The design maintains a physical separation within the intersection to define the turning paths of motor vehicles, slow vehicle turning speed, and offer a comfortable place for people bicycling to wait at a red signal.



Typical Use

- Streets with separated bikeways protected by wide buffer or on-street parking.
- Where two separated bieways intersect and two-stage left-turn movements can be provided for bicycle riders.
- Helps reduce conflicts between right-turning motorists and bicycle riders by reducing turning speeds and providing a forward stop bar for bicycles.
- Where it is desirable to create a curb extension at intersections to reduce pedestrian crossing distance.

Design Features

A Setback bicycle crossing of 19.5 feet allows for one passenger car to queue while yielding. Smaller setback distance is possible in slow-speed, space constrained conditions.

B Corner island with a 15-20 foot corner radius slows motor vehicle speeds. Larger radius designs may be possible when paired with a deeper setback or a protected signal phase, or small mountable aprons. Two-stage turning boxes are provided for queuing bicyclists adjacent to corner islands.

C Use intersection crossing markings.

Protected intersections feature a corner safety island and intersection crossing markings.

Protected intersections incorporate queuing areas for two-stage left turns.

Further Considerations

- Pedestrian crosswalks may need to be further set back from intersections in order to make room for two-stage turning queue boxes.
- Wayfinding and directional signage should be provided to help bicycle riders navigate through the intersection.
- Colored pavement may be used within the corner refuge area to clarify use by people bicycling and discourage use by people walking or driving.
- Intersection approaches with high volumes of right turning vehicles should provide a dedicated right turn only lane paired with a protected signal phase. Protected signal phasing may allow different design dimensions than are described here.

Materials and Maintenance

- Green conflict striping (if used) will also generally require higher maintenance due to vehicle wear.
- Bikeways should be maintained so that there are no pot holes, cracks, uneven surfaces or debris.
- Bikeways protected by concrete islands or other permanent physical separation, can be swept by street sweeper vehicles with narrow widths.

Approximate Cost

The cost of protected intersection elements vary depending on materials used and degree of implementation desired.

- Complete reconstruction costs comparable to a full intersection.
- Retrofit implementation may be possible at lower costs if existing curbs and drainage are maintained. Inexpensive materials can used, such as paint, concrete planters, and bollards.

05: Bicycle Facility Amenities

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Wayfinding Sign Types

The ability to navigate through a city is informed by landmarks, natural features, and other visual cues. Signs throughout the city should indicate to bicyclists the direction of travel, the locations of destinations and the travel time/distance to those destinations. A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes.

Typical Application

- Wayfinding signs will increase users' comfort and accessibility to the bicycle network.
- Signage can serve both wayfinding and safety purposes including:
- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

Design Features

A Confirmation signs indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route. Can include destinations and distance/time but do not include arrows.

B Turn signs indicate where a bikeway turns from one street onto another street. These can be used with pavement markings and include destinations and arrows.

C Decisions signs indicate the junction of two or more bikeways and inform bicyclists of the designated bike route to access key destinations. These include destinations, arrows and distances. Travel times are optional but recommended.

Community Logos on Signs

Wayfinding signs can include a local community identification logo, as this example from Oakland, CA.

Custom Street Signs (Berkeley, CA)

Custom street signs can also act as a type of confirmation sign, to let all users know the street is prioritized for bicyclists.

Further Considerations

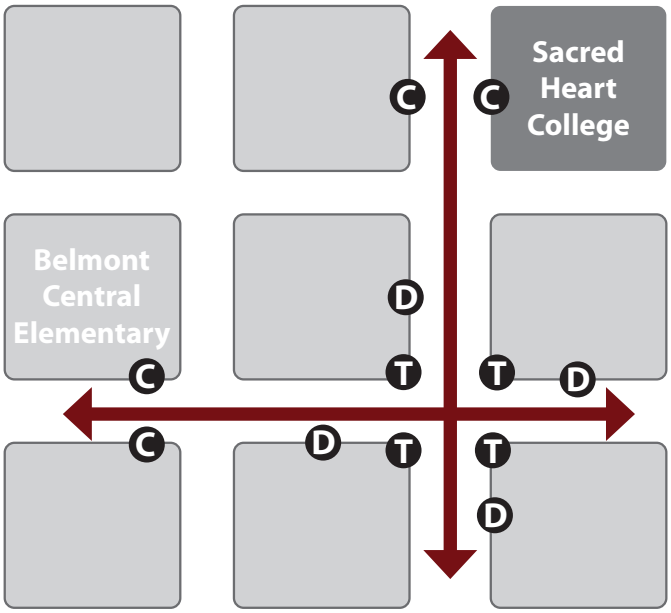
- Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes.
- Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.
- A community-wide bicycle wayfinding signage plan would identify:
    - Sign locations
    - Sign type – what information should be included and design features
    - Destinations to be highlighted on each sign – key destinations for bicyclists
    - Approximate distance and travel time to each destination
- Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.
- Check wayfinding signage along bikeways for signs of vandalism, graffiti, or normal wear and replace signage along the bikeway network as-needed.

Approximate Cost

Wayfinding signs range from $150 to $500

Wayfinding Sign Placement

Signs are placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.



Typical Application

Confirmation Signs

- Placed every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 feet of a turn or decision sign).
- Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs

- Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through).
- Pavement markings can also indicate the need to turn to the bicyclist.

Decision Signs

- Near-side of intersections in advance of a junction with another bicycle route.
- Along a route to indicate a nearby destination.

Design Features

- MUTCD guidelines should be followed for wayfinding sign placement, which includes mounting height and lateral placement from edge of path or roadway.
- Pavement markings can be used to reinforce routes and directional signage.

Wayfinding Pavement Markings

Some cities use pavement markings to indicate required turns along the bicycle route.

Further Considerations

- It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to 5 miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Approximate Cost

The cost of a wayfinding sign placement plan depends on the scale and scope of the approach. Trail wayfinding signage range from $500-$2000.

Bike Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of two hours or less, or long-term parking for employees, students, residents, and commuters.

Typical Application

- Bicycle parking facilities shall be located in highly visible well-lighted areas. In order to maximize security, whenever possible short-term bicycle parking facilities shall be located in areas highly visible from the street and from the interior of the building they serve (i.e. placed adjacent to windows).

- Bike racks provide short-term bicycle parking and is meant to accommodate visitors, customers, and others expected to depart within two hours. It should be an approved standard rack, appropriate location and placement, and weather protection.

- On-street bike corrals (also known as on-street bicycle parking) consist of bicycle racks grouped together in a common area within the street traditionally used for automobile parking. Bicycle corrals are reserved exclusively for bicycle parking and provide a relatively inexpensive solution to providing high-volume bicycle parking. Bicycle corrals can be implemented by converting one or two on-street motor vehicle parking spaces into on-street bicycle parking. Each motor vehicle parking space can be replaced with approximately 6-10 bicycle parking spaces.

Design Features

- All bicycle facilities shall provide a minimum 4 foot aisle to allow for unobstructed access to the designated bicycle parking area.
- Bicycle parking facilities within auto parking facilities shall be protected from damage by cars by a physical barrier such as curbs, wheel stops, poles, bollards, or other similar features capable of preventing automobiles from entering the designated bicycle parking area.
- Bicycle parking facilities should be securely anchored so they cannot be easily removed and shall be of sufficient strength and design to resist vandalism and theft.

Bike Racks

A 2 foot minimum from the curb face to avoid 'dooring.'

B 4 feet between racks to provide maneuvering room.

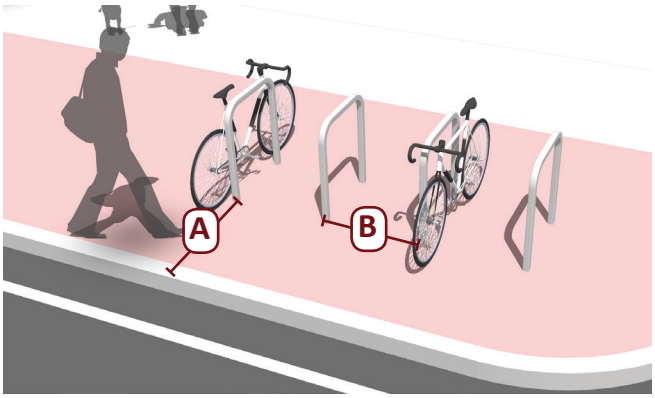
- Locate close to destinations; 50 foot maximum distance from main building entrance.
- Minimum clear distance of 6 feet should be provided between the bicycle rack and the property line.

Bike Corrals

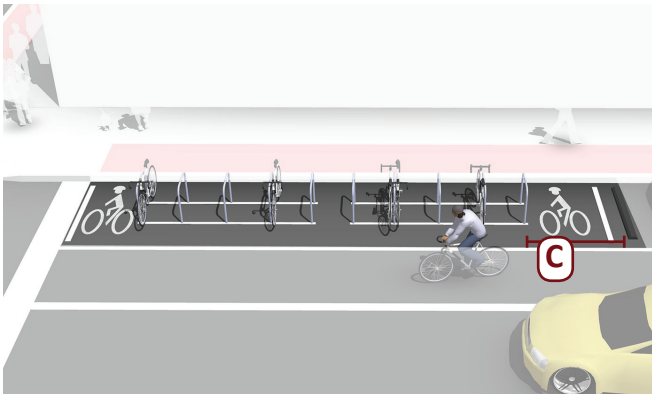
C Bicyclists should have an entrance width from the roadway of 5-6 feet for on-street corrals.

- Can be used with parallel or angled parking.
- Parking stalls adjacent to curb extensions are good candidates for on-street bicycle corrals since the concrete extension serves as delimitation on one side.
- Off-street bike corrals are appropriate where there is a wide sidewalk furnishing zone (7 feet or greater), or as part of a curb extension.

Perpendicular Bike Racks



Bike Corral

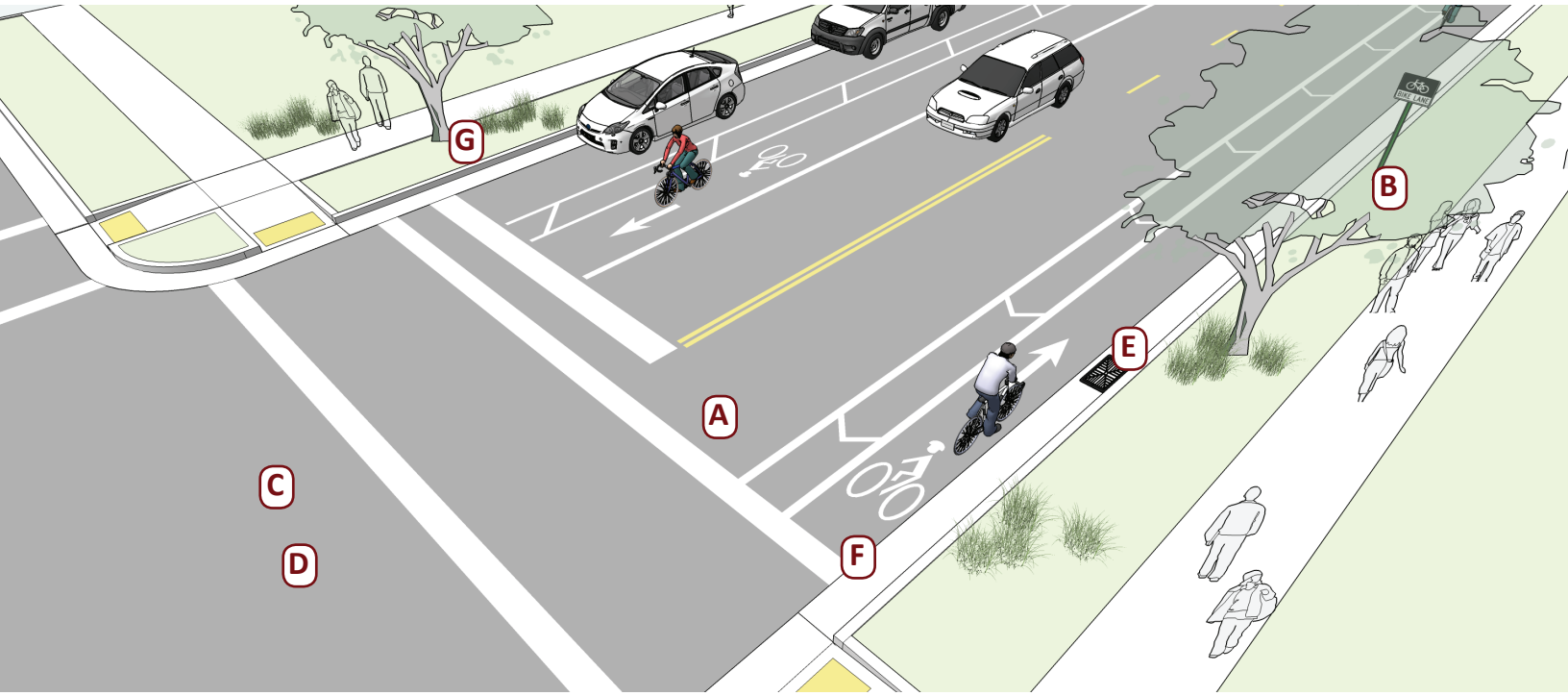


Approximate Cost

Costs can vary based on the design and materials used. Bicycle rack costs can range from approximately $60 to $3,600, depending on design and materials used. On average the cost is approximately $660. Bicycle lockers costs range from $1,280 to $2,680.

Bikeway Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flush, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities. The following recommendations provide a menu of options to consider to enhance a maintenance regimen.



MAINTENANCE

A Sweeping

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.

B Signage

- Check regulatory and wayfinding signage along bikeways for signs of vandalism, graffiti, or normal wear.
- Replace signage along the bikeway network as-needed.
- Perform a regularly-scheduled check on the status of signage with follow-up as necessary.
- Create a Maintenance Management Plan.

C Roadway Surface

- Maintain a smooth pothole-free surface.
- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼ inch.
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.

D Pavement Overlays

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.
- If the shoulder or bike lane pavement is of good quality, it may be appropriate to end the overlay at the shoulder or bike lane stripe provided no abrupt ridge remains.
- Ensure that inlet grates, manhole and valve covers are within ¼ inch of the finished pavement surface and are made or treated with slip resistant materials.

E Drainage Grates

- Require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats.
- Create a program to inventory all existing drainage grates, and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate should not be an acceptable alternative to replacement.

F Gutter to Pavement Transition

- Ensure that gutter-to-pavement transitions have no more than a ¼ inch vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.

G Landscaping

- Ensure that shoulder plants do not hang into or impede passage along bikeways
- After major damage incidents, remove fallen trees or other debris from bikeways as quickly as possible
- Maintenance Management Plan
- Provide fire and police departments with map of system, along with access points to gates/ bollards
- Enforce speed limits and other rules of the road
- Enforce all trespassing laws for people attempting to enter adjacent private properties

Maintenance Activity	Frequency
Inspections	Seasonal – at beginning and end of Summer
Pavement sweeping/blowing	As needed, with higher frequency in the early Spring and Fall
Pavement sealing	5 - 15 years
Pothole repair	1 week – 1 month after report
Culvert and drainage grate inspection	Before Winter and after major storms
Pavement markings replacement	As needed
Signage replacement	As needed
Shoulder plant trimming (weeds, trees, brambles)	Twice a year; middle of growing season and early Fall
Tree and shrub plantings, trimming	1 – 3 years
Major damage response (washouts, fallen trees, flooding)	As soon as possible