CITY OF SAN RAMON
BICYCLE MASTER PLAN

Final Plan | April 2018

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Chapter 1: Introduction

San Ramon is a growing, vibrant suburban community with a favorable landscape for bicycling: mild temperatures, dry weather, and generally flat topography. Currently, the City of San Ramon has an extensive bicycle network of bike lanes, bike routes, and multi-use paths throughout the city, including the jewel of the system - the regional Iron Horse Trail.

The existing network has been developed over time based on standard practices in bicycle planning and engineering. Today, the San Ramon community is interested in taking the existing network to the next level to create connected, accessible routes that are comfortable for people of all ages and abilities.

To develop this enhanced network, the City of San Ramon has taken the significant step of creating the San Ramon Bicycle Master Plan (Plan) – the first plan devoted exclusively to bicycling in San Ramon. The purpose of the Plan is to develop a comprehensive bicycle network that provides a vision for bikeway facilities and a suite of supportive programs and infrastructure.

Let's Get Rolling!

This Plan is organized into five chapters and five appendices.

- **Chapter 1** introduces the Plan, including the vision, goals, and planning approach.
- **Chapter 2** summarizes the existing bicycling conditions in San Ramon.
- **Chapter 3** presents and describes the Proposed Bicycle Network.
- **Chapter 4** provides recommendations for infrastructure and programs that support bicycling.
- **Chapter 5** describes the implementation strategy for the Plan recommendations.
- **Appendix A** includes a summary of the public and stakeholder engagement that shaped the Plan.
- **Appendix B** includes the State of Bicycling in San Ramon report, which expands upon the information in Chapter 2.
- **Appendix C** provides an overview of local, regional, state and federal plans and policies related to bicycling.
- **Appendix D** contains the Bicycle Facilities Toolkit, a design guide for implementing bikeway facilities and associated improvements.
- **Appendix E** includes a summary of the Plan's fulfillment of Caltrans Active Transportation Program (ATP) grant requirements.
- **Appendix F** details the complete project list and associated cost estimates for the Proposed Bicycle Network.

Why Now?

This is an exciting time for the City of San Ramon. The City has planned for a number of projects that will reinvent many areas in the community to create more bikeable, walkable spaces. The City Center is soon to become a vibrant new cultural and lifestyle destination in the heart of San Ramon. Additionally, San Ramon Valley Boulevard will soon be home to new mixed-use and infill projects, and the Faria Preserve Project will add up to an additional 618 residential units between Bollinger Canyon Road and San Ramon Valley Boulevard.

In addition to developing the Plan, the City is demonstrating its commitment to improved biking and walking by installing bicycle and pedestrian bridges over the Iron Horse Trail at Crow Canyon Road and Bollinger Canyon Road to close critical gaps in the regional bicycle network. These connections will serve City Center, employment areas in Bishop Ranch, and provide links to many schools and other community destinations.

Challenges and Opportunities

Currently, San Ramon has a well-connected north-south bicycle network, and some facilities, such as the regional Iron Horse Trail, are essential for bicyclists of all ages and skill levels. Other facilities, such as bike lanes along major arterials with high traffic volumes and speeds, can be stressful for even the most confident riders.

While San Ramon has many enthusiastic recreational riders, relatively few people bike for transportation purposes. According to the 2006-2010 American Community Survey, the City of San Ramon had a 0.5% mode share of people bicycling to work.[1]

San Ramon's roadway network has a traditional suburban form: local residential streets are mostly disconnected, and wide, higher speed arterial streets serve as the crosstown connections and provide freeway access. For many people, this makes bicycling difficult. Major arterial roadways such as Bollinger Canyon Road and Crow Canyon Road accommodate high vehicle volumes and speeds, and lack continuous bicycle facilities. Where bikeway facilities are present, bike lane markings frequently end in advance of intersections, driveways, and interchanges which can create a stressful bicycling environment.

Many suburban communities experience these challenges, and the City of San Ramon is dedicated to improving bicycling conditions. The City has already made great strides in building a bicycle network and is well positioned to strengthen its bicycle network by:

- Identifying lower-stress bike routes along low speed streets;
- Providing bicyclists with additional protection on roads with high vehicle speeds and volumes through the construction of buffered bike lanes or physically separated bike lanes;
- Developing better east-west connections throughout the city;
- Building more connectivity between off-street paths and on-street bikeways;
- Enhancing bicycle facilities through conflict areas such as intersections, driveways and bus stops;
- Installing additional bicycle detection at signalized intersections; and
- Uniform wayfinding signage to identify bike routes throughout the city.

The Plan incorporates each of these elements and provides a blueprint for expanding the bicycle network that is accessible for all bicyclists.

Vision and Goals

The following vision, goals, and objectives were developed to guide the Plan recommendations and will be used to measure the City's progress towards implementation over time. These were collaboratively developed by the community, Plan Subcommittee, and City staff.[2]

San Ramon Bicycle Master Plan Vision Statement:

San Ramon aspires to encourage, motivate and accommodate bicycle riding for all ages and abilities. San Ramon will strive to remain a bicycle friendly community where the bicycle network is enjoyed by all. Residents, students, commuters and visitors will choose to bicycle for trips because it's safe, comfortable, convenient, and well-integrated throughout the San Ramon community and promotes alternative transportation and a healthy lifestyle.

1 Source: U.S. Census Bureau, 2006-2010 American Community Survey

2 The BMP Subcommittee was comprised of City staff, Transportation Advisory Committee members, Teen Council members, Bishop Ranch representatives, and community stakeholders, and provided input and guidance for the development of the 2018 BMP.

Table 1.1. Goals and Objectives of the Plan

Goals		Objectives
Connectivity	Complete network of low-stress on- and off-street bicycle facilities	• Build and maintain a dense, low-stress network of on- and off-street bicycle facilities that seamlessly connects to commercial and employment centers, schools, parks, existing trails such as the Iron Horse Trail, transit centers, and public facilities • Coordinate with local and regional agencies to create a bicycle system that extends beyond the City's limits and continuously connects to adjoining communities and the countywide bikeway network
Safety	Improve safety for bicyclists	• Reduce the number and severity of bicycle crashes • Provide safe crossings at intersections and freeway on- and off-ramps • Reduce conflict between bicycle facilities and parking, motor vehicles, and freight • Provide safe and convenient routes for San Ramon students to bike to school
Mode Share	Increase bicycle mode share	• Increase the percentage of trips taken by bicycle for commuting, recreation, and other trips • Reduce dependence on driving by creating a comfortable environment for people of all bicycling levels
Equity	Provide equitable access to bicycling for all community members	• Create a bicycle network that serves users of all ages and abilities • Implement accessibility standards for physically disabled persons within the public rights-of-way
Community	Develop a strong bicycle community identity while advancing a culture of respect and responsibility for all transportation system users	• Receive designation as a Bicycle Friendly Community from the League of American Bicyclists • Implement educational programs and initiatives that promote understanding and empathy among transportation users, and educate all users about traffic laws and safe practices • Sustain community initiatives that help make bicycling a viable and safe part of daily life, such as the TDM Program, Street Smarts Traffic Safety Program, Residential Traffic Calming Program, Safe Routes to School Program and TRAFFIX Program
Land Use Integration	Link the bicycle network with land uses and destinations	• Encourage new development to incorporate Complete Street concepts, connections to the bicycle and trail network, and install bike amenities and infrastructure such as bike racks, bike lockers, and other components of the City's Plan • Through the development review process, create bicycle connections within Bishop Ranch Business Park/other employment centers, commercial districts, and neighborhoods to enhance connectivity

Planning Process

The Plan was developed over a year-long process, beginning in early 2017. Throughout the process, the City of San Ramon sought community feedback on bicycling conditions and input on the desired improvements. Several common themes and priorities emerged from the community's feedback, including a desire for:

- More comfortable bicycle facilities
- Safer bicycle crossings at intersections/streets
- Stronger east-west connections
- More bicycle facilities that connect to community destinations
- Reducing delay for bicyclists at large, signalized intersections

The community's input, paired with a data-driven analysis of existing conditions and a needs assessment, formed the basis of the Plan's vision, goals, objectives, network development, and recommendations.

Highlights of the outreach efforts are discussed in this section; additional information can be found in Appendix A.

Online Outreach

The City launched an online interactive map, called a "WikiMap," to gather input about the existing bicycle network. The WikiMap was available online from May to August 2017. Users were asked to identify routes they already ride, where they would like to bike, and any barriers to biking.

The map, shown in Figure 1.1, was available as a link from the project webpage and was advertised and encouraged through public outreach events. The WikiMap received comments from over 130 people who provided invaluable input about the state of bicycling in San Ramon and specific areas to address in this Plan.

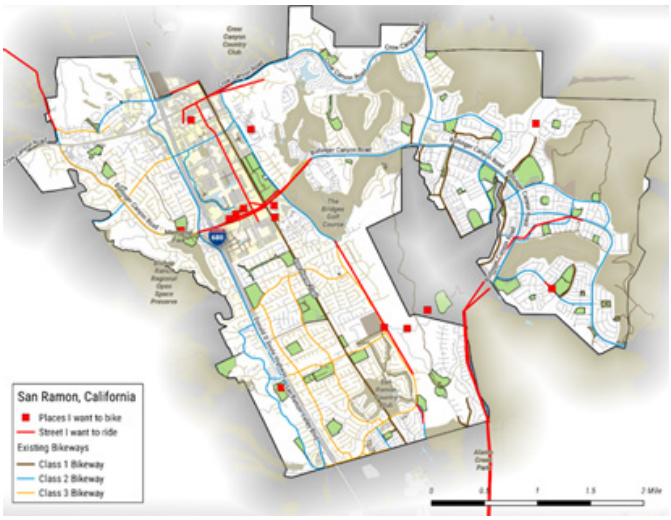


Figure 1.1. WikiMap Results – Places People want to Bike

Community Outreach Events

Three community outreach events were held to solicit input and share ideas. The first event was held on Bike to Work Day on May 11, 2017, along the Iron Horse Trail. Staff spoke with over 75 people, including people commuting to work, riding for recreation, and students on their way to school. The second event, a Community Workshop, was held on October 19, 2017, to share information on the Plan process, familiarize the community with different types of bicycle facilities and treatments, and gather input on the community's priorities and reactions to the initial set of bike network recommendations. Over 35 community members attended the event, including Subcommittee, Planning Commission, and TAC members; bike commuters; recreational riders; and families. The community's local knowledge and feedback was used to revise the bicycle network recommendations.

Figure 1.2. Participant at Plan outreach table.

The third event, a Community Workshop, was held on March 8, 2018, to share the final recommendations for the bicycle network and support programs and to solicit input. Over 40 community members attended, and their comments are incorporated into the final plan.

Plan Subcommittee

The development of the 2018 Plan was also guided by strategic input from the Plan Subcommittee which was comprised of City staff, Transportation Advisory Committee members, Teen Council members, Bishop Ranch representatives, and community stakeholders.

The Plan Subcommittee formally met four times throughout the process and provided input on community priorities; feedback on specific locations and issues of concern; and preferred types of bicycle improvements.

In addition to the formal meetings, the Plan Subcommittee also hosted a citywide tour of bicycle facilities for the project team on June 22, 2017. Throughout the tour, the Subcommittee provided observations and feedback on the existing bicycle facilities and ideas for improvements. This information was key in developing the recommended bicycle network for San Ramon.

Chapter 2: Existing Bicycle Network

An assessment of current bicycling conditions provides a basis to develop recommendations for the proposed bicycle network. This chapter provides an overview of the existing bicycle network and collision trends. For more information, see Appendix B: State of Bicycling in San Ramon.

In addition to physical existing conditions, the City of San Ramon has several adopted plans and policies that influence the City's transportation investments and priorities. Appendix C: Plans and Policies Review summarizes these plans and policies, with an emphasis on proposed projects or design guidance that may be applicable to the Plan.

Bicycle Facilities

The citywide bicycle network is comprised approximately 55 miles of existing facilities (see Table 2.1). A map of the existing network is illustrated in Figure 2.2.

Table 2.1. Length of Existing Facilities

Existing Facility	Approximate Length (in miles)
Multi-Use Paths (Class I)	9
Bike Lanes (Class II)	34
Bike Routes (Class III)	12
Total Network	55

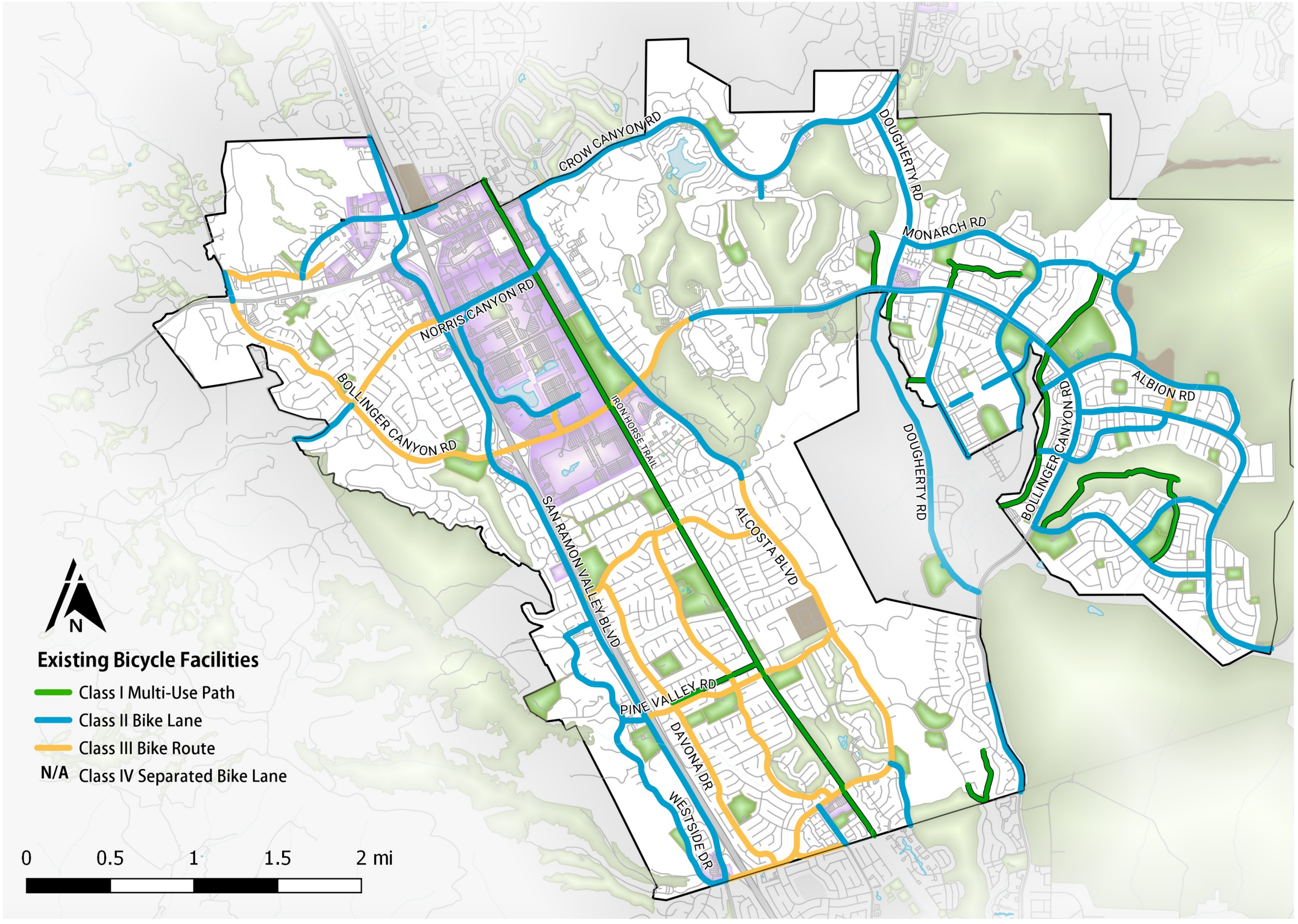
Figure 2.1. Bicyclist at the 2017 Bike to Work Day Energizer Station on the Iron Horse Trail.

Connectivity

The City's existing bicycle network offers multiple choices for north-south connections, such as the Iron Horse Trail and bike lanes along on San Ramon Valley Boulevard, Dougherty Road, and Windemere Parkway. Both Bollinger Canyon Road and Alcosta Boulevard offer partial bike lanes/bike routes. Except for the Iron Horse Trail, these north-south routes are on streets with high vehicle speeds and volumes.

Overall, the bicycle network lacks dedicated, easily accessible east-west connections. A few east-west connections are provided by a partial bike lane on Bollinger Canyon Road; bike route on Montevideo Drive; bike route on Pine Valley Road; and the Cross Valley Trail.

Figure 2.2. Existing Bikeways in San Ramon



Class I Multi-Use Paths

Class I Multi-use paths are two-way paved facilities, physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Multi-use paths are often located in an independent alignment, such as a greenway. Multi-use paths provide low-stress facilities for cyclists.

Trails are unpaved paths accessible by bicycle and pedestrians.

Figure 2.3. Iron Horse Trail, an example of a Class I multi-use path

Examples in San Ramon:

- Iron Horse Trail (4.48 miles within San Ramon)
- Cross Valley Trail (0.73 miles)
- West Alamo Creek Trail (1.1 miles)

The backbone of the city's bicycle system is the Iron Horse Trail, a regional multi-use path which connects to Danville in the north and Pleasanton in the south (see Figure 2.3). The Iron Horse Trail is managed by the East Bay Regional Park District and runs from Pleasanton to Concord. The Trail links to the Bishop Ranch commercial and office center, the future San Ramon City Center, San Ramon City Hall, San Ramon Transit Center, the San Ramon Community Center, numerous schools, parks, and neighborhoods.

Additional multi-use paths, such as the Cross Valley Trail, are great assets to the San Ramon bike network because they provide comfortable and safe routes for cyclists and pedestrians; however, many routes do not connect to community destinations or other trails. The Iron Horse Trail and other off-street facilities are the building blocks of a growing low-stress bicycle network. Ensuring strong connections to and from these facilities is a key element of the Proposed Bicycle Network.

Class II Bicycle Lanes

Class II Bicycle Lanes provide an exclusive space for bicyclists in the roadway and are established by painting lines and symbols on the roadway surface. Bicycle lanes are for one-way travel and are typically provided in both directions on two-way streets and/or on one side of a one-way street.

Figure 2.4. Bicyclists in a Class II bicycle lane on San Ramon Valley Boulevard.

Figure 2.5. Example of a Class II buffered bicycle lane in Dallas, TX.

Class II Buffered Bicycle Lanes are implemented by painting or otherwise creating a flush buffer zone between a bicycle lane and the adjacent travel lane. While buffers are typically used between bicycle lanes and motor vehicle travel lanes to increase bicyclists' comfort, they can also be installed between bicycle lanes and parking lanes.

Examples in San Ramon:

- San Ramon Valley Boulevard (7.5 miles)
- Portions of Bollinger Canyon Road (2.4 miles)
- Dougherty Road (2.2 miles)
- Westside Drive (2.1 miles)

Standard bike lanes are the primary facility type along most major roads in San Ramon, especially along north-south routes. Most of the bike lanes are located in residential neighborhoods in eastern San Ramon.

Standard bike lanes are an appropriate facility type for streets with a maximum posted speed limit of 25 miles per hour and volumes between 3,000-8,000 vehicles per day. Currently, many bicycle lanes in San Ramon are on roadways with higher speeds (often 45 miles per hour) and much higher vehicle volumes (see Figure 2.4). As an enhancement to standard bicycle lanes, a striped buffer can be added to provide horizontal separation from vehicles (see Figure 2.5).

Key opportunities to enhance the bicycle network include converting bicycle lanes on high-speed, high-volumes roads, such on San Ramon Valley Boulevard or eastern Bollinger Canyon Road, to multi-use paths or separated bicycle lanes to provide more protection and lower-stress facilities for bicyclists. Construction is currently underway for buffered bike lanes on the Faria Preserve Parkway.

Class III Bike Routes

Class III Bike Routes have signage that indicate that the roadways are shared with bicyclists or motor vehicle traffic. In general, these should be located on roads with low traffic speeds and volumes as a part of a signed route or bicycle boulevard. **Class III Bicycle Boulevards** are applied on quiet streets, often in residential neighborhoods. These treatments are designed to prioritize bicycle through-travel, while reducing through traffic volumes and maintaining relatively low motor vehicle speeds. Treatments vary depending on context and often include elements of traffic calming.

Figure 2.6. Bicycle boulevard in Portland, OR

Examples in San Ramon:

- Portions of Bollinger Canyon Road (2.45 miles)
- Broadmoor Drive (2.1 miles)
- Portions of Alcosta Boulevard (2.0 miles)
- Montevideo Drive (1.3 miles)

While bicycle lanes are the primary facility type in San Ramon, bicycle routes are the second most-common facility type comprising almost 22 percent of the network. Most bicycle routes are located in the residential neighborhoods in south-central San Ramon and a few are located along Bollinger Canyon Road and Norris Canyon Road in the northwestern and north-central areas of the city (see Figure 2.6).

Bicycle routes are designated with road markings such as Sharrows or signage to indicate a shared lane environment between bicyclists and drivers.

While signage and markings support wayfinding and indicate bicyclist positioning on shared streets, they do not provide any protection or separation between people driving and people bicycling. Shared routes are appropriate on low-volume, low-speed roadways with fewer than 3,000 vehicles per day and posted speeds below 25 MPH, such as residential streets.

Opportunities exist to improve bicycle routes to bicycle boulevards. Bicycle boulevards are shared routes that seek to calm motor vehicle traffic and maintain low motor vehicle speeds through traffic calming and other measures. The traffic calming measures depend on the context; some treatments may include traffic diverters, speed attenuators such as speed humps, pavement markings, and signs. Opportunities are also present to improve bike routes to bike lanes or possible multi-use paths, where feasible and appropriate.

Bicycle Safety

Improving safety for bicyclists is an expressed goal of this Plan, and preventing and mitigating bicycle collisions is a key consideration behind the network and spot improvement recommendations in Chapter 3. Not only is safety and the reduction of bicycle collisions a public health issue, addressing safety concerns is also an important way to encourage more people to ride a bicycle. Understanding collision factors and trends will allow the City to identify and prioritize investments that can have the greatest impact on improving safety for bicyclists and other users of the roadway.

To better understand collision history in San Ramon, injury crash data from 2006-2013 were reviewed.[3] Over the seven-year period, 71 bike collisions occurred, resulting in 69 injuries and two deaths. See Figure 2.7 for a map of bicycle collisions.

Collision Locations

The majority of bicycle/vehicle crashes (60 percent) occurred on major arterials, as shown in Table 2.2. These streets, except for Montevideo Drive, are major arterials with high vehicle speeds and volumes. Many of the remaining collisions in San Ramon occurred on Class III bike routes and Class II bike lanes that are shared with auto traffic.

Table 2.2. Top Locations of Bike Collisions in San Ramon

Street	Number of Bike Collisions (2006–2013)	Percent of Bike Collisions
San Ramon Valley Rd	17	24%
Bollinger Canyon Rd	10	14%
Alcosta Blvd	8	11%
Montevideo Dr	7	10%

Identifying safety improvements along these high collision corridors will have an important impact on improving safety. The bicycle network recommendations (see Chapter 3) include upgraded facilities that provide greater protections for these four roadways.

Primary Collision Factors

Based on UC Berkeley Transportation Injury Mapping System (TIMS) data, the most common reason for reported bicycle crashes in San Ramon is due to users traveling on the "wrong side of the road"; 30 percent of crashes were due to this.[4] The second most-common reason (17 percent) was related to "automobile right of way" in which when another mode (bike or pedestrian) is in the ROW/path of an oncoming vehicle because of not yielding correctly.[5] The third most-common reason was related to "improper turning".[6] Table 2.3 summarizes the primary collision factors in San Ramon.

Table 2.3. Primary Bicycle Collision Factors (Data Source: TIMS)

TIMS Code – Primary Collision Factor (Bike Crashes 2006–2013)	Number
Wrong Side of Road	24
Automobile Right of Way	12
Improper Turning	8
Failure to Heed Traffic Signals and Signs	4
Following Too Closely	2
Pedestrian Violation	2
Unsafe Starting or Backing	2
Driving or Bicycling Under the Influence of Alcohol or Drug	1
Unsafe Speed	1
Unsafe Lane Change	1
Other, Not Stated, Unknown	14

With this knowledge of the primary collision factors, the City can develop tailored educational messaging and programming to address factors such as "wrong side of road" or "automobile right of way." A pairing of programs and facility upgrades can increase safety for bicyclists, pedestrians, and other roadway users in San Ramon.

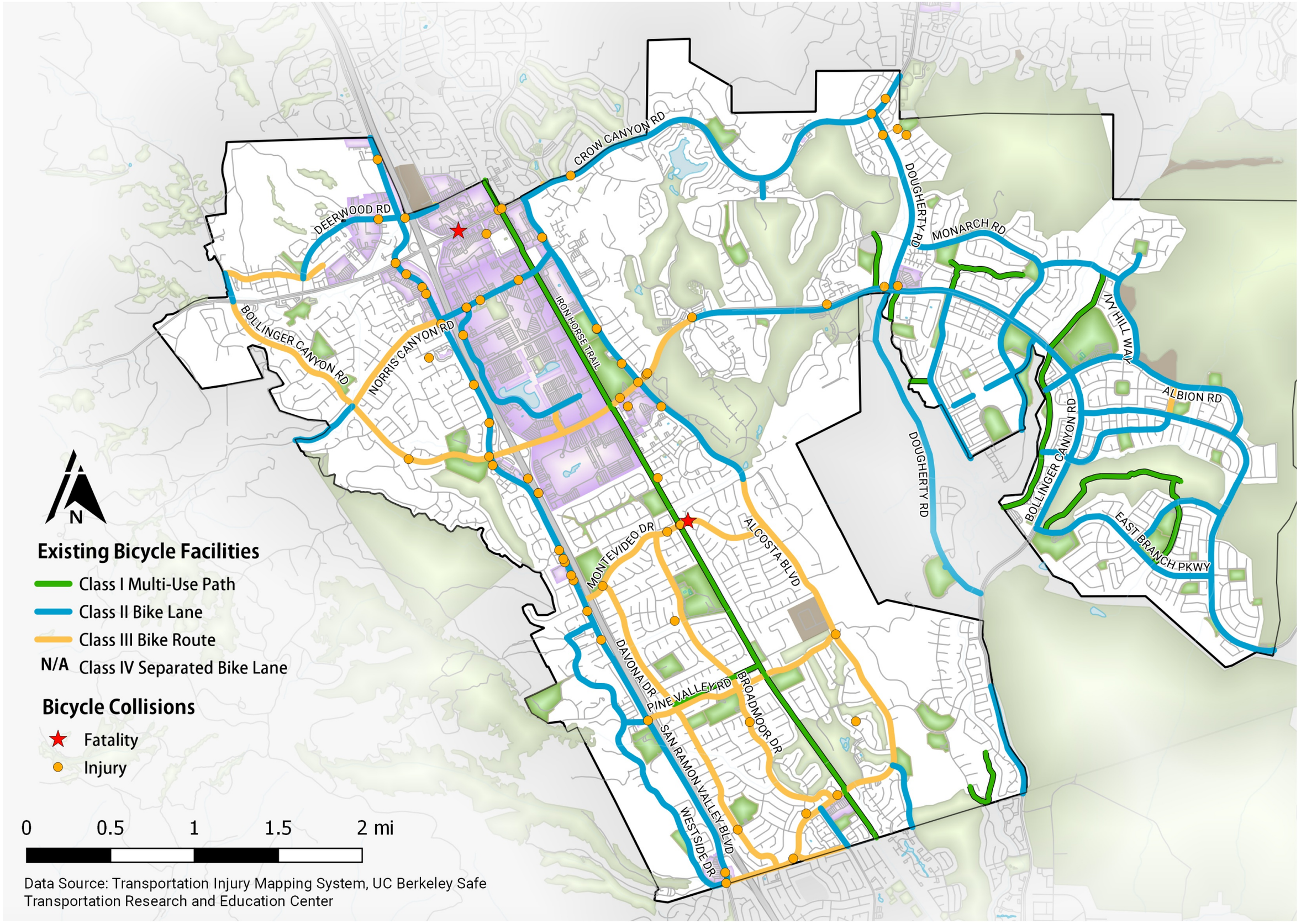
3 Collision data was gathered from the University of California-Berkeley's Safe Transportation Research and Education Center's Transportation Injury Mapping System (TIMS). The most recent data available is from 2006 to 2013.

4 Wrong Side of Road indicates that one of the users was traveling in the incorrect direction. In most bike crashes, this means that the bicyclist was going in the opposite direction of travel, whether in a lane on the road or on the sidewalk. The most likely crash scenario is if the driver is making a right turn, they look to the left to check for vehicle traffic and then start turning right, not seeing a bicyclist coming from the right.

5 Automobile Right of Way refers to when another mode (bike or pedestrian) is in the ROW/path of an oncoming vehicle because of not yielding correctly. An example collision might be a bicyclist not stopping at a stop sign and getting hit by a driver proceeding straight through the intersection.

6 Improper Turning refers to making a turn without the necessary precautions. An example of a collision caused by improper turning is the "right hook," in which a driver turns right without checking and/or yielding to a bicyclist in the bike lane to the right of their vehicle.

Figure 2.7. Distribution of Bike Collisions in San Ramon (Data Source: TIMS)



Chapter 3: Proposed Bicycle Network

The primary purpose of this plan is to identify a future bicycle network for San Ramon that enhances safety, connected, and a viable transportation choice for all members of the San Ramon community. The Proposed Bicycle Network presented in this chapter aims to meet these goals by building on the assets of the existing network to create an experience that is comfortable for everyone interested in bicycling.

Creating an All Ages, All Abilities Network

The Vision for the Plan includes creating a safe and comfortable bicycle network that can be enjoyed by all residents, students, commuters, and visitors. Many factors contribute to people choosing to ride a bicycle, with a major factor being safety.

Research has found that a large percentage of the American population is interested in bicycling for transportation, but does not currently do so because they feel unsafe. Several studies have shown that many people feel safer and more comfortable riding on low-traffic streets or on facilities that provide protection or physical separation from fast-moving traffic. Most people in the U.S. – approximately 60 percent – have little tolerance for interacting with motor vehicle traffic unless volumes and speeds are very low (see Figure 3.1). This group of riders is referred to as "Interested but Concerned," reflecting both their interest in bicycling for transportation as well as concerns about safety and comfort when interacting with motor vehicle traffic.

Proposed Bicycle Network

The proposed bicycle network map (see Figure 3.2) was developed based on fieldwork, an analysis of existing conditions, input from the community and City staff, and in consideration of best practices in bicycle network planning, including facility guidance from Appendix D: Bicycle Facilities Toolkit. The resulting network includes high-quality infrastructure in the form of multi-use paths, separated bike lanes, buffered bike lanes, traditional bike lanes, and bike boulevards. It also includes spot improvements at key intersections, freeway interchanges, and to close network gap.

Figure 3.1. Four Types of Bicyclists

Comfort Typology of Bicyclists

Design User Profile	Non-Bicyclist	Interested but Concerned	Somewhat Confident	Highly Confident
Percent of General Public	31-37%	51-56%	5-9%	4-7%

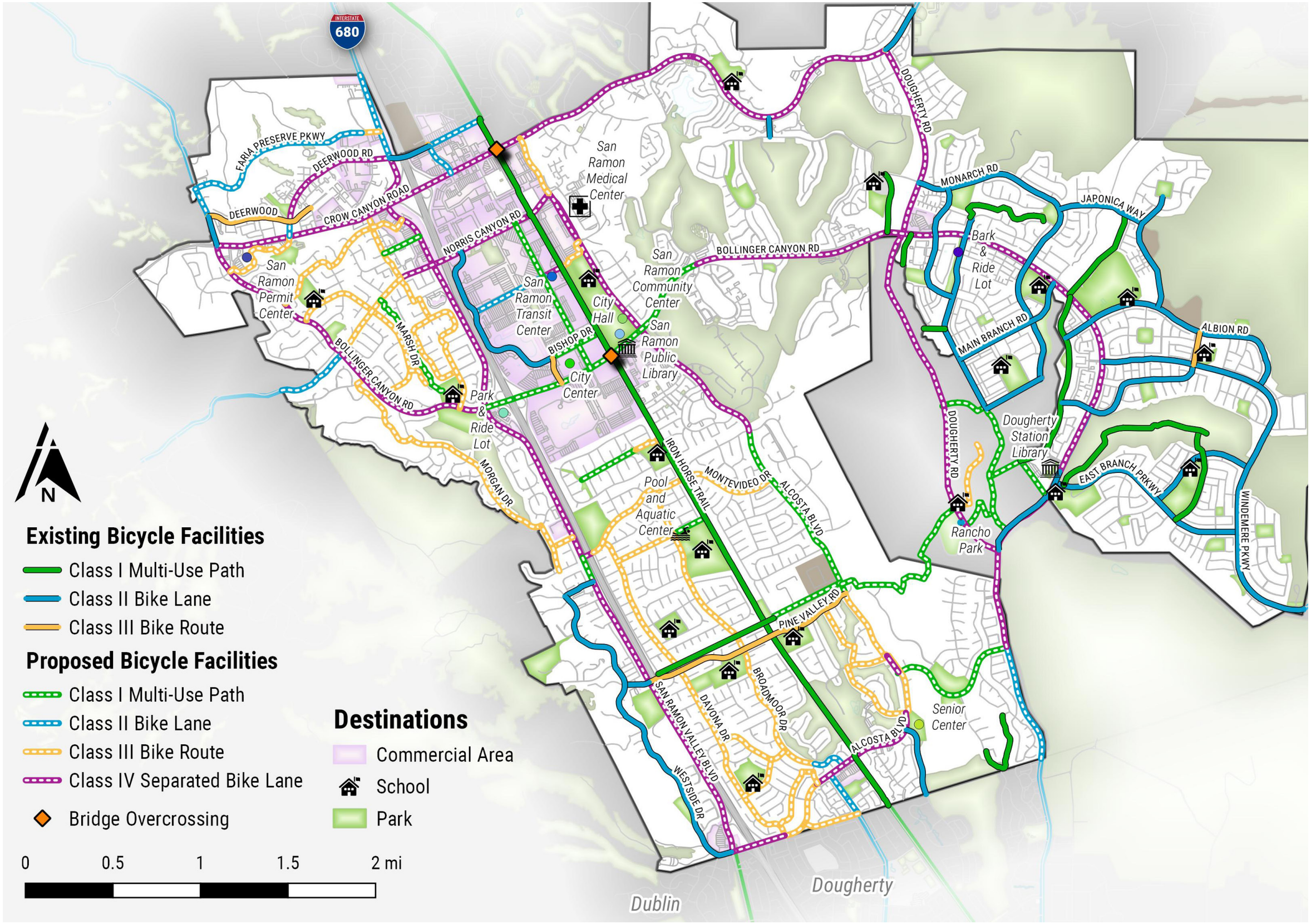
A bicycle network in San Ramon will accommodate the largest number of people if it provides facilities that serve "Interested but Concerned" riders. Given the right bicycle facilities, education, and encouragement, these residents may choose to ride a bicycle for transportation. Facilities that serve this group will also serve "Somewhat Confident" and "Highly Confident" bicyclists. Therefore, to increase bicycling in San Ramon and build a safe and comfortable bike network for everyone, the Plan was developed using a "low-stress network" planning approach that aims to serve "Interested but Concerned" bicyclists.

The Proposed Bicycle Network, which addresses the needs of "Interested but Concerned" riders, is an 82-mile network consisting of:

Facility	Proposed Length (approximate, in miles)	Existing Length (approximate, in miles)
Multi-Use Paths (Class I)	19	9
Bike Lanes (Class II)	19	34
Bike Routes (Class III)	20	12
Separated Bike Lanes (Class IV)	24	N/A
Total Network	82	55

The construction of these proposed facilities will create a comprehensive, connected, and comfortable bicycle system to link to community destinations, such as schools, transit, trails, retail areas, and adjacent jurisdictions.

Figure 3.2. Proposed Bicycle Network for San Ramon



Network and Spot Improvement Recommendations

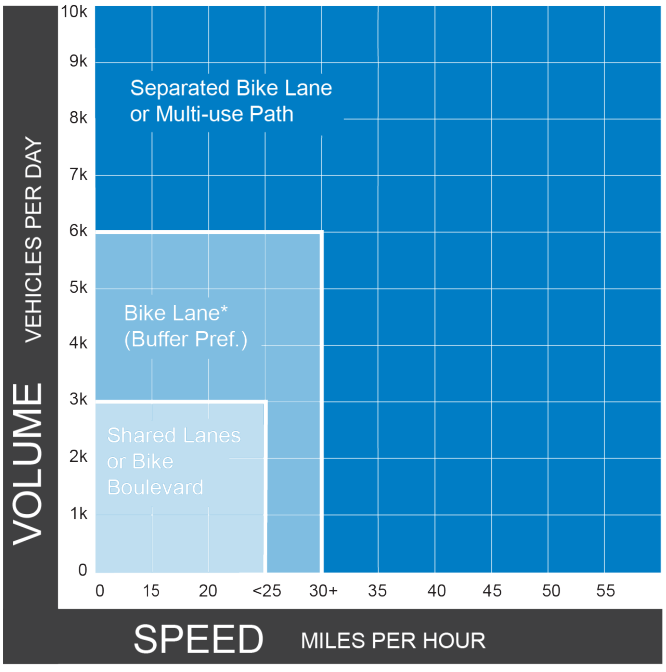
The following actions are recommended to build the Proposed Bicycle Network. Buildout of the network can be accomplished through two methods: (1) network implementation such as corridor or multi-use trail project; and (2) spot improvements such as intersection striping. Implementation opportunities and guidance for each of the proposed actions are described in this section.

Category	Proposed Action
Network	Implement Context-Appropriate Bike Facilities
	Provide Stronger East-West Connections
	Upgrade On-Street Bike Lanes and Bike Routes to Separated Facilities
	Create Bicycle Boulevards
Spot Improvements	Improve Bicycle Facilities at Intersections

Implement Context-Appropriate Bike Facilities

The Proposed Bicycle Network includes a variety of facility types. These facility types can provide an all ages, all abilities bicycling experience if implemented on the right types of streets and with the proper design features.

Figure 3.3. Bicycle Facility Selection Chart



*advisory bike lanes may be an option where traffic volume < 6k ADT

To determine which facilities are appropriate for each roadway, the Bicycle Facility Selection Chart should guide facility selection (see Figure 3.3). This chart provides guidance based on speed limit and traffic volume.

The Bicycle Facilities Toolkit in Appendix D and other national best practice design guidance from AASHTO, FHWA, and NACTO should inform the implementation of all proposed facilities.

Provide Stronger East-West Connections

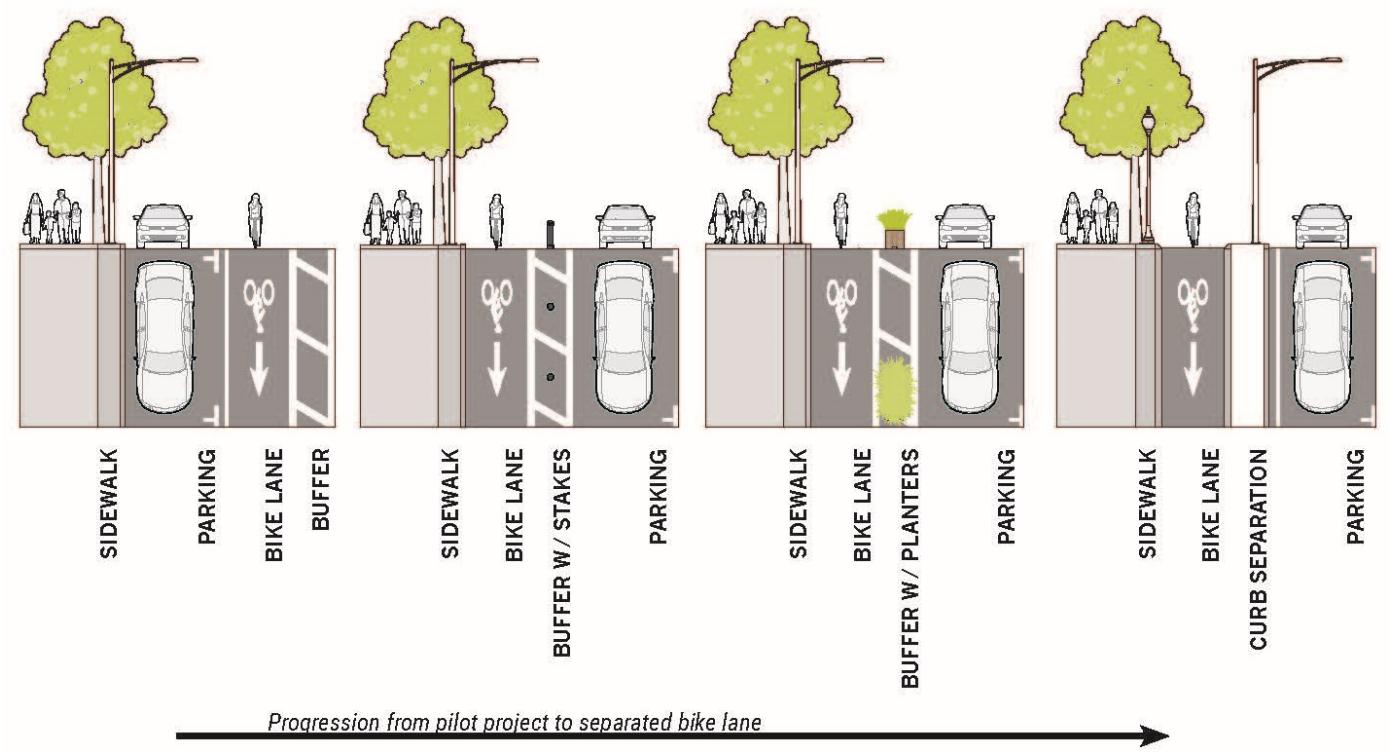
The city lacks crosstown east-west connections. The Proposed Bicycle Network includes low-stress facilities on Crow Canyon Road, Bollinger Canyon Road, Norris Canyon Road, and Old Ranch Road. These facilities create additional, and better protected, cross-city links.

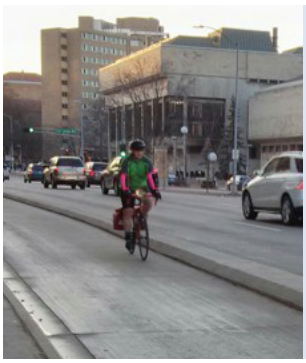
Upgrade On-Street Bike Lanes and Bike Routes to Separated Facilities

Many of the most direct routes in San Ramon follow arterial streets. Applying low-stress design principles and acknowledging San Ramon residents' preference for riding on a facility with separation from motor vehicles, the Plan proposes seven miles of separated facilities on key corridors throughout the city. The corridors include San Ramon Valley Boulevard, Crow Canyon Road, and Bollinger Canyon Road. Implementing separated facilities will serve to upgrade existing facilities to provide additional protection for all bicyclists. The exact design of these facilities will vary from street to street.

Separated bike lanes have been implemented in many cases as low-cost retrofit projects, such as using flex posts and paint within the existing right-of-way. More permanent forms of separation, such as curb-protected bike lanes, cost more and are less flexible once implemented. A phased implementation approach, where "pilot" projects transition to permanent protected bike lanes may address both problems, by implementing the facility slowly and troubleshooting before permanent materials and high costs are necessary, as shown in Figure 3.4. For roadways with separated bike lanes, special attention should be paid to intersection and driveway design to ensure maximum protection at conflict locations. For more information, see Appendix D.

Figure 3.4. Progression of a separated bike lane





Class IV separated bike lanes, also referred to as a protected bike lane or cycle track, are an exclusive bikeway facility type that are physically separated from motor vehicle traffic by barriers. Barriers could include raised islands, planters, flexible posts, or on-street parking. A separated bike lane is separate and distinct from the sidewalk and combines the user experience of a multi-use path with the on-street infrastructure of a conventional bike lane.

Figure 3.5. Examples of separated bike lanes.

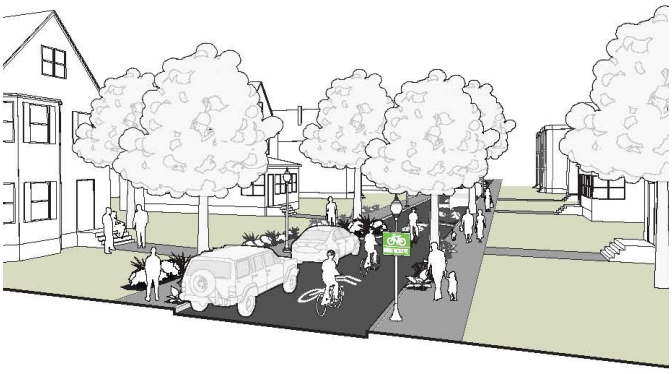
Create Bicycle Boulevards

The proposed network calls for 11 miles of bike boulevards, located on low-speed, low-volume streets that prioritize bicycle travel. In some areas, these bicycle boulevards will provide alternative routes to arterial roadways and can be implemented in the short-term. If needed to meet speed and volume thresholds, these streets may include traffic calming measures to increase comfort for pedestrians and bicyclists. Traffic calming measures vary depending on context; however, treatments include traffic diverters, speed attenuators such as speed humps or chicanes, pavement markings, and signs (see Figure 3.6). Streets with bicycle boulevards should be engineered for a target speed of 20 mph to create a comfortable riding environment for bicyclists to share the road with automobiles, and a safer environment for adjacent residents and pedestrians.

Improve Bicycle Facilities at Intersections

Intersections are often one of the most challenging parts of the bike network to navigate through. For example, in San Ramon bike lanes frequently end before the intersection (e.g. bike lane striping that does

Figure 3.6. Example of a bicycle boulevard along a neighborhood street.



not continue all the way to the stop bar) and are not carried through to the other side, causing confusion and stress for bicyclists as well as drivers. In addition, signalized intersections do not always detect bicyclists or require bicyclists to wait extended periods of time to cross. Unsignalized crossings can also be challenging to navigate and may require long waiting times for a gap in vehicular traffic to cross.

Spot treatments that enhance safety and comfort at intersections can significantly improve the riding experience throughout the length of the network (see Figure 3.7). A new traffic signal or High-Intensity Activated Crosswalk (HAWK) hybrid signal may be required to provide a safe crossing at some locations. However, at many intersections, signal improvements, geometric changes, or supplementary pavement markings may treatments may include bicycle signal detection, bike boxes, turning queue boxes, crosswalks, curb extensions, and curb radius reductions, among others. Some intersections in San Ramon have existing bicycle signal detection; however, these are not monitored as a part of the City's maintenance program. Requests for changes to the bicycle signal detection can be made through the City's Citizen Request Management portal.

Figure 3.7. Intersection pavement markings are designed to improve visibility, alert all roadway users of expected behaviors, and reduce conflicts with turning vehicles.

While spot improvements may be completed as opportunities arise (e.g., as part of a routine resurfacing or street improvement project), a goal should be completion of a series of improvements to intersections along a low-stress corridor. This coordinated approach will enable bicyclists to travel along continuous low-stress routes.

The Iron Horse Trail Bicycle/Pedestrian Overcrossings Project will install overcrossings at Bollinger Canyon Road and Crow Canyon Road along the Iron Horse Trail. The purpose of the project is to improve safety by eliminating conflicts between pedestrians/bicycles and vehicles; improve vehicular traffic flow by removing the at-grade crossings; enhance safety by providing an environment that encourages pedestrian and bicycle usage along the Iron Horse Trail; and increase trail use by nearby schools by improving safety at the Bollinger Canyon Road and Crow Canyon Road crossings.

What is a bike box?

Figure 3.8. Example of a bike box.

A bike box provides dedicated space between the crosswalk and vehicle stop line where bicyclists can wait during the red light at signalized intersections. This allows bicyclists to take a position in front of motor vehicles at intersections which improves visibility and awareness of the bicyclist.

Chapter 4: Support Programs

City policies and support programs are key ingredients to creating a welcoming, bicycle-friendly community. Generally, policies are set by the City government, while internal programs (such as Street Smarts) are implemented by advocacy organizations.

San Ramon already has several education, encouragement, and enforcement programs related to bicycling which are described below. This chapter summarizes these recommendations by each programmatic category – Engineering, Encouragement, Education, Enforcement, and Evaluation.

The League of American Bicyclists categorizes the five aspects of a Bicycle Community as follows:

- **Engineering:** Creates safe and convenient places to ride and park
- **Encouragement:** Creates a strong bike culture that welcomes and celebrates bicycling
- **Education:** Gives people of all ages and ability levels the skills and confidence to ride
- **Enforcement:** Ensures safe roads for all users
- **Evaluation and Planning:** Plans for bicycling as a safe and viable transportation option

Engineering

In addition to bicycle facility infrastructure, support facilities provide increased comfort and predictability for bicyclists. Table 4.1 summarizes existing support facilities provided by San Ramon and opportunities to expand upon these.

Table 4.1. Existing and Recommended Engineering Programs

Support Facility	Description	Learn More	Plan Goal(s)
Existing			
Bicycle rack and locker program	The City, using grant funds, has initiated a bike rack program, with installation of bike racks at commercial centers, such as the Marketplace, Transit Center, and school sites. The City has also installed bike lockers at the San Ramon Transit Center and the Dougherty Valley Bark and Ride Lot. The City of San Ramon Zoning Ordinance also require minimum bicycle parking for new projects.	http://www.sanramon.ca.gov/cms/one.aspx?portalId=10826130&pageId=12163427	Community; Land Use Integration
Recommended			
Install Citywide Wayfinding	Create and install citywide bicycle wayfinding to help bicyclists navigate the roadway network with confidence and find their way past barriers, such as complex intersections or high-stress streets. Wayfinding can include stand-alone signs, markings painted on the street, or other signage.	https://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/bike-route-wayfinding-signage-and-markings-system/	Connectivity; Land Use Integration
Provide end-of-trip facilities	Consider the requirement of end-of-trip facilities, such as dedicated indoor bicycle storage, showers, lockers, and other facilities	https://bikesmakelifebetter.com/bike-parking-for-employers-developers-a-guide-to-end-of-trip-facilities/	Connectivity; Community; Land Use Integration

Encouragement

Encouragement helps create a strong and fun bicycle culture and can lead to increases in bicycle mode share. Table 4.2 lists the existing programs and recommended actions to increase the promotion of bicycling in San Ramon.

Table 4.2. Existing and Recommended Encouragement Programs

Support Program	Description	Learn More	Plan Goal(s)
Existing			
BRiteBikes Bikeshare program	BRiteBikes is Bishop Ranch's bike-share program for their tenants. Once registered, tenants can access the bikes using their Clipper Cards.	www.bishopranch.com/customer-resources/transportation/bikes/	Community; Land Use Integration
Bikes on County Connection buses	Each County Connection bus is equipped with a rack that holds two bicycles. Transit riders can load their bikes while taking the bus.	https://countyconnection.com/how-to-ride/bikes-on-buses/	Mode Share; Community
Bike to Work Day events	The City has sponsored Bike to Work Day events on the third Thursday in May to encourage and promote bicycling in the city.	Contact City staff for more information	Community
Recommended			
Increase partnerships with community bicycle organizations	Form a strong relationship between the City, bicycle advocates, and bicycle clubs to realize the Plan's vision and goals, such as implementing a mutually-beneficial project to strengthen San Ramon's bike culture.	www.calbike.org/local_partners	Community
Hold additional bicycle-focused events, such as Open Streets Events	Hold events that promote and celebrate bicycling and encourage participation from neighborhoods throughout the city. This could include Open Streets events in which a roadway is closed to motorized traffic on a pre-determined day to allow people to walk, bike, and roll on a street free of motor vehicles.	http://openstreetsproject.org/	Community
Promote the San Ramon Bike Map	Create an interactive online bicycle map to reflect low-stress routes.	http://map.tahoebike.org/	Connectivity; Community
Create a Bicycle Friendly Business Program	Develop a bicycle friendly business program to support businesses that encourage bicycling by their employees and customers.	https://bikeleague.org/business	Community

Education

Bicycle education helps everyone interested in bicycling feel comfortable riding and navigating the streets. Table 4.3 details the expansion of existing programs and new education opportunities to create a more bicycle-friendly San Ramon.

Table 4.3. Existing and Recommended Education Programs

Support Program	Description	Learn More	Plan Goal(s)
Existing			
Street Smarts Program	Since 2004, this collaborative program provides traffic safety education to students throughout the San Ramon Valley.	http://street-smarts.com/	Safety; Community
Safe Routes to School Program (SRTS)	Since 1989, the SRTS Program has been a collaborative effort between San Ramon school districts and the City to promote bicycle safety, pedestrian awareness, and traffic safety along school routes and on school sites.	www.ci.san-ramon.ca.us/our_city/departments_and_divisions/public_works/streets/safe_routes_to_school	Safety; Community

Education continued

Support Program	Description	Learn More	Plan Goal(s)
Recommended			
Establish a bicyclist, pedestrian, and motorist safety education program	Create a program to foster better understanding of the safety needs of all roadway users. This may include bicycle-related educational materials covering the rules of the road or safe driving, biking, and walking tips.	www.pedbikeinfo.org/programs/education.cfm	Safety; Community
Create a Strap & Snap Program	Enhance the Streets Smarts Program to create a Strap & Snap program that teaches children the importance of wearing bicycle helmets and has free giveaways of bicycle helmets and lights.	www.fcgov.com/bicycling/strap-snap.php	Safety; Community
Develop bicycle-focused electronic and print communication materials	Develop print and electronic communication materials, including a website, to educate residents and decision-makers about the benefits of bicycling and to promote consistent and accurate messaging about bicycle projects and new bicycle infrastructure, programs (such as adult bicycle skills courses offered by local organizations, such as Bike East Bay), enforcement, safety, funding sources, and other topics. Materials could be developed in multiple languages.	www.metro.net/riding/bikes/	Safety; Community

Enforcement

Enforcement initiatives provide opportunities to institutionalize a safe and consistent transportation system for all users by prioritizing the links between law enforcement and bicyclists. Table 4.4 includes recommended enforcement programs.

Table 4.4. Recommended Enforcement Programs

Support Program	Description	Learn More	Plan Goal(s)
Recommended			
Establish a Bike Patrol	Develop a program, led by the Police Department, to explore the feasibility of creating a bicycle patrol program for San Ramon.	www.el-cerrito.org/246/Bicycle-Patrol-Program	Safety; Community
Establish a Police Department-led program to conduct bicycle/pedestrian safety-related activities	Building on the San Ramon Police Department's bicycle helmet enforcement program, develop a program to reward good behavior and to reach bicyclists engaging in unsafe behavior (such as riding the wrong way or riding without lights)	www.pedbikeinfo.org/programs/enforcement.cfm	Safety; Community
Explore Diversion Programs	Partnering with the Police Department, explore the feasibility of creating a diversion program, that would provide driver and bicyclist education in lieu of written citations and fines for traffic offenses.	https://bikeeastbay.org/BikeTrafficSchool	Equity; Community
Establish a program to ensure bicycle lanes remain free of barriers	Partnering with the Police Department, establish a program to assess locations where bicycle lanes are often blocked, especially around schools. Ensure that bicycle lanes remain free of barriers, including parked cars, by installing signage and through enforcement.	www.calbike.org/bicycling_in_california_sharing_the_road	Safety

Evaluation and Planning

Evaluation serves to track progress in implementing the Plan and to identify what's working, what's not, and where additional effort is needed. Planning helps to put new programs and policies into action. Table 4.5 outlines existing evaluation programs and opportunities to expand.

Table 4.5. Existing and Recommended Evaluation and Planning Programs

Support Program	Description	Learn More	Plan Goal(s)
Existing			
Develops bicycle collision annual reports	Collisions are reviewed by the Police Department as they occur, and the review informs potential actions. The City purchased a Crossroads Collision Database software to analyze the safety issues, and the City has an ordinance requiring the City to issue annual traffic safety reports which includes bicycle and pedestrian collisions.	www.ci.san-ramon.ca.us/cms/One.aspx?portalId=10826130&pageId=11621972	Safety
Established a formal Transportation Advisory Committee that addresses bicycle/pedestrian issues	The City's Transportation Advisory Committee, comprised of San Ramon residents, meets monthly to address transportation issues and provide recommendations to the Council.	http://sanramonca.iqm2.com/Citizens/Board/1041-Transportation-Advisory-Committee-TAC	Community
Recommended			
Create a formal BPAC to guide Bicycle Master Plan implementation	Establish a Bicycle and Pedestrian Advisory Committee to assist City staff in implementing the Plan, developing an annual action plan, and tracking progress.	www.half-moon-bay.ca.us/390/BicyclePedestrian-Advisory-Committee-BPA	Community
Establish a Bike Count Program to collect bicycle and pedestrian volumes	Begin a bicycle count program, potentially including the strategic addition of automated bicycle counters at locations around the city, short duration counts to complement automated counts, and the application of count data to inform infrastructure, programmatic, and policy choices.	www.pedbikeinfo.org/planning/tools_counts.cfm	Mode Share
Conduct Pre- and Post-Studies of new bicycle infrastructure projects	Conduct pre- and post-studies of the new bicycle infrastructure projects to gauge ridership, safety benefits, and other measures of effectiveness.	https://ddot.dc.gov/page/bicycle-facility-evaluation	Connectivity; Mode Share
Conduct biking and walking safety assessments around schools	Conduct assessments around schools to identify barriers and challenges for students who walk and bike to school. Assessments could be conducted in partnership with the Safe Routes to School program.	http://saferoutes.lacity.org/walking-safety-assessments/	Safety, Connectivity, Community, Mode Share

Chapter 5: Implementation and Funding

The infrastructure and program recommendations in Chapters 3 and 4 provide strategies and actions that will support San Ramon in becoming a safer and more comfortable place to bicycle. This chapter summarizes the strategy for implementing these projects and programs. In addition, this chapter provides an overview of the prioritization metrics and methodology used to weigh projects to determine which should happen in the short- and long-term.

Figure 5.1. Bicyclists enjoying Bike to Work Day on the Iron Horse Trail.

Project Prioritization

Because San Ramon has limited financial resources, it is not possible to implement all the recommended projects immediately. While all these projects play an important role in a region-wide, safe, and connected bicycle network, certain projects are going to provide greater benefits by meeting demand and connecting key destinations. To identify the projects that will increase in bicycling mode share and improve bicyclists' safety and comfort, recommended projects were subjected to a data driven prioritization process using Geographic Information Systems (GIS). Several criteria related to safety, connectivity, demand and equity were used to identify priority projects.

While these projects have been prioritized, the City should remain nimble and opportunistic when implementing the Plan's recommendations. Opportunities may arise to implement lower-priority projects in the short-term, such as pairing the installation of new bicycle facilities with repaving schedules, while the implementation of some higher-priority projects may be delayed for various reasons. While flexibility is key, this prioritization strategy offers a way for decision makers and planners to have a thoughtful and intentional path forward for implementation.

Table 5.1. Prioritization Criteria

Connectivity (4 points maximum) Evaluates a project's ability to create new connections or to enhance existing connections.	
Criteria	**Points**
Provide a new complete and continuous low stress facility	4
Provide at least 1/2 mile of a low stress facility	3
Close a gap or create a new facility, but do not provide a low-stress facility	2
Improve an existing facility, but do not provide a low-stress facility	1
Demand and Comfort (3 points maximum) Evaluates a project's ability to attract new biking trips based on the stress experienced by the bicyclist. Proposed facilities that feel more comfortable and accommodate a wider range of users of all ages and abilities are prioritized.	
Criteria	**Points**
Protected bikeways, protected intersections, or other low traffic stress facilities that are well-used existing corridors	3
Buffered bike lanes; or bicycle boulevards and bicycle lanes on lower volume roadways	2
Medium to high traffic stress bikeway projects on well-used existing bike routes	1

Key Destinations and Demand (3 points maximum)

Evaluates projects within 1/2 mile radius of key destinations (such as transit stations, commercial centers, schools, and park/bark and ride lots) that would attract new biking trips.

Criteria	Points
Within a 1/4 mile of the key destinations, and is a well-used existing bike route	3
Within a 1/2 mile of the key destinations, and is a well-used existing bike route	2
Well-used existing bike routes, or within a 1/2 mile of a key destination	1

Feasibility (3 points maximum)

Evaluates projects based on ease of implementation. Projects that do not require easements, property acquisition, or additional pavement are prioritized to focus on cost-effective improvements. Political support is considered expressed interest by City officials and/or members of the public.

Criteria	Points
Have all of the following qualities: are feasible, have political support, are strong-contenders for grant funding, and are cost-effective	3
Have at least two of the following qualities: are feasible, have political support, are strong-contenders for grant funding, and are cost-effective	2
Have at least one of the following qualities: are feasible, have political support, are strong-contenders for grant funding, and are cost-effective	1

Safety (4 points maximum)

Based on the number of bicycle collisions on the roadway in the past five years.

Criteria	Points
On-Street Facilities	
Improve biking on the "safety priority network," and provide or improve a bicycle facility at a location with at least one severe or fatal injury condition in the past five years	4
Improve biking on the "safety priority network," or has a severe or fatal injury in the past five years	3
Provide or improve a bicycle facility at a location with two or more bicycle collisions in the past five years	2
Provide or improve a bicycle facility at a location with one bicycle collision in the past five years	1
Off-Street Facilities Evaluated based on potential for conflicts with motor vehicles; prioritizes trails or paths with one or more missing or unenhanced uncontrolled crossings, particularly where the crossing occurs on a multi-lane roadway; intended to prioritize projects that install or enhance new trail or path crossings with the appropriate traffic control.	
Trail or paths that have one or more uncontrolled crossings or are missing crossings of arterials	3
Trail or paths that have one or more uncontrolled crossings or are missing crossings of multilane collectors	2
Trail or paths that have one or more uncontrolled crossings or are missing crossings of major driveways, or projects that have one or more uncontrolled crossing at local streets with limited sight distance	1

Safe Routes to School (4 points maximum)

Prioritizes bicycle projects that are common biking routes to schools; in close proximity to schools; and enhances the safety of school-aged students.

Criteria	Points
Along a school frontage or any block face with a school entrance	4
Within 1/8 mile of a school	3
Within 1/4 mile of a school	2
Within 1/2 mile of a school	1

Implementation Strategies

Project Implementation

To focus the City's resources, the Proposed Bicycle Network was further analyzed to prioritize the projects for implementation. Table 5.2 includes the "Top Tier" projects for implementation; the maximum prioritization score is 21 points (see Table 5.1 for prioritization criteria). Some projects will be implemented through the City's Capital Improvement Program (CIP), other City resources, grants, or development improvements. Other projects, such as signing and striping projects, will be implemented through the City's Pavement Management Program. For a complete project list with prioritization scores, see Appendix F: Proposed Bicycle Network Project List.

Table 5.2. Top Tier Projects

Project ID	Location	Cross Street X	Cross Street Y	Existing Facility	Proposed Facility	Prioritization Score
10	Executive Pkwy	Bishop Drive	Alcosta Blvd	N/A	Bike Lane, Bike Boulevard	14
1	Alcosta Blvd	Norris Canyon Dr	San Ramon Valley Blvd	Bike Lanes, Bike Routes	Separated Bike Lane, Multi-Use Path, Bike Boulevard	13
2	Bollinger Canyon Rd	Faria Parkway	Dougherty Rd (south)	Bike Lanes, Bike Routes, Shared sidewalk	Separated Bike Lane, Multi-Use Path	12
12	Montevideo Dr	San Ramon Valley Blvd	Alcosta Blvd	Bike Route	Bike Boulevard	12
6	Dougherty Rd	Crow Canyon Rd	Bollinger Canyon Rd (south)	Bike Lanes	Separated Bike Lanes, Buffered Bike Lane	12
15	San Ramon Valley Blvd	Deerwood Rd	Southern City Limit	Bike Lanes	Separated Bike Lane	11
5	Deerwood Rd	Crow Canyon Rd	San Ramon Valley Blvd	N/A	Bike Lane, Buffered Bike Lane	10
14	Old Ranch Rd	Alcosta Blvd	Dougherty Rd	N/A	Multi-Use Path	10
16	Village Pkwy	Alcosta Blvd	Southern City Limit	Bike Lanes	Buffered Bike Lane	10

Roadway Surfaces

As the City moves forward with implementation, attention should be paid to the quality of the roadway surface along bikeways. Rough surfaces in a bike facility creates an uncomfortable bicycling experience and may pose safety hazards.

At the outset of implementation, the City should evaluate roadway surface quality where bicycle facilities are recommended. Maintenance of roadways and removal of debris should be prioritized where bicycle facilities are present.

Cost Estimates

The total cost of all the projects identified in this Plan is approximately $45-48 million. This cost is presented to provide a base for the City to seek funding opportunities for implementation. Costs for the individual facilities are detailed in Table 5.3. These are planning-level cost estimates that include contingencies. The City will need develop detailed estimates during the preliminary engineering stage (PS&E) to calculate more exact project costs due to highly variable right-of-way, construction, drainage, grading, or other unforeseen costs.

Table 5.3. Facility Cost Estimates

Facility	Approximate Cost (per mile)
Class I Multi-Use Path	$890,000
Class II Bicycle Lanes (without buffer)	$40,000
Class II Bicycle Lanes (with buffer)	$70,000
Class III Bike Routes/Bike Boulevards	$40,000
Class IV Separated Bike Lanes	$140,000

Cost estimates for the support program are not provided as the costs to implement these programs can vary greatly. The City should outline the necessary element of each program and establish a cost prior to establishing the programs.

Funding

In the past, the City has implemented much of the existing on-street bicycle network using street maintenance resources and dedicated funding. For future projects, the City is interested in pursuing new capital investment, sustained commitment from City Council, and other funding opportunities.

To implement the Proposed Bicycle Network and recommended programs, San Ramon should continue seeking grant funds. The City should also increase the proportion of Capital Improvement Program (CIP) funds dedicated to bicycle projects. The City should also continue leveraging development-driven projects to implement portions of the bicycle network and installation of support facilities.

Grants also present an opportunity to secure funding for implementing the Proposed Bicycle Network, and General and CIP funds can be used to leverage regional, state, and federal funding. See Table 5.4 for a summary of available grants.

Table 5.4. Potential funding sources for bicycle programs and projects

Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
Federal Funding Sources					
TIGER Discretionary Grants	U.S. Department of Transportation	Annually although the program has been suspended; the last call for projects was in October 2017	For capital projects. Competitive at the national level (highly competitive).	Bikeways and crossing improvements	www.transportation.gov/tiger
State Funding Sources					
State Active Transportation Program	Caltrans	Varies; next call for projects will be in Spring 2018.	Consolidation of several older grant programs, including State SRTS and Bicycle Transportation Account. Funds a wide range of capital and non-capital projects. Both programs give some preference to projects in disadvantaged communities. The state program is competitive among jurisdictions statewide; the regional program is competitive among Bay Area jurisdictions.	Bikeways, crossing improvements and most programmatic activities.	www.dot.ca.gov/hq/LocalPrograms/atp
California Office of Traffic Safety grants	California OTS	Annually (last round was due January 30, 2018)	For traffic-safety education, awareness and enforcement programs aimed at drivers, pedestrians and cyclists.	Certain activities under the SRTS, safety/education and enforcement programs.	www.ots.ca.gov/Grants/default.asp
Highway Safety Improvement Program	Caltrans	Varies; most recent call for projects was in spring 2016 with projects selected in November 2016	For projects and programs that reduce traffic fatalities and serious injuries by correcting or improving a specific problem. Highly competitive at the state level.	Safety-related pedestrian, bikeway and crossing projects. Certain activities under the SRTS, safety/education and enforcement programs; also, certain spot improvements.	www.dot.ca.gov/hq/LocalPrograms/hsip.html
Affordable Housing and Sustainable Communities Program	California Strategic Growth Council	Annually; last call for projects expected in March 2017.	Projects that facilitate compact development, including bicycle infrastructure and amenities, with neighborhood scale impacts. Available to government agencies and institutions (including local government, transit agencies and school districts), developers and non-profit organizations.	Bikeways and crossing improvements, particularly those in the area covered in specific plans	www.sgc.ca.gov/programs/ahsc/

Table 5.4. continued

Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
Regional Funding Sources					
Regional Active Transportation Program	Metropolitan Transportation Commission	Varies; the last "Cycle" of projects (Cycle 3.5) was accepted in August 2017	Consolidation of several older grant programs, including State SRTS and Bicycle Transportation Account. Funds a wide range of capital and non-capital projects. Both programs give some preference to projects in disadvantaged communities. The state program is competitive among jurisdictions statewide; the regional program is competitive among Bay Area jurisdictions.	Bikeways, crossing improvements and most programmatic activities.	www.mtc.ca.gov/funding/ATP
Transportation Fund for Clean Air, Regional Fund	Bay Area Air Quality Management District	Annually (last submittals were due in April 2017)	Funds bicycle facilities, including paths, lanes, routes, lockers and racks. The Regional Fund is competitive among Bay Area jurisdictions; the County Program Manager Fund is competitive among Contra Costa County jurisdictions.	Bikeways and bicycle crossing improvements.	www.baaqmd.gov/grant-funding/public-agencies/bikeways-roads-lanes-paths
Bicycle Rack Voucher Program	Bay Area Air Quality Management District	Ongoing, although the last cycle closed in June 2016	Vouchers for up to $60 per bicycle parking space created (up to $15,000 per applicant per year. Racks must be installed within one-tenth of a mile of at least one major activity center and maintained in service for at least three years. Available only to public agencies.	Bicycle parking racks	www.baaqmd.gov/grant-funding/public-agencies/brvp
County Funding Sources					
One Bay Area Grant County Program	Contra Costa Transportation Authority	OBAG just started a round of projects, funding them from 2017/18 - 2021/22.	Infrastructure projects that reduce vehicle trips, including pedestrian and bicycle facilities.	Bikeways and crossing improvements.	https://mtc.ca.gov/our-work/fund-invest/investment-strategies-commitments/focused-growth/one-bay-area-grants
Transportation Development Act Article 3	Contra Costa Transportation Authority	Every 2–3 years; the most recent submittals were due in January 2018	Competitive among Contra Costa County jurisdictions. Funds plans, safety education, and design and construction of capital projects.	Bikeways, crossing improvements and safety/education/training programs for school children and the general population.	ccag.ca.gov/opportunities/call-for-projects

Table 5.4. continued

Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
Contra Costa Measure J Pedestrian, Bicycle and Trail Facilities	Contra Costa Transportation Authority	Every few years; the last strategic plan was developed in 2016.	Competitive among Contra Costa County jurisdictions.	Bikeways and crossing improvements, particularly on the arterials or regional trails	http://ccta.net/_resources/detail/2/1
Contra Costa Measure J Local Streets and Roads Maintenance	Contra Costa Transportation Authority	Annually	A portion of the available countywide funds are distributed to Moraga on a formula basis	Funds are typically used for general roadway projects but may be used for bikeways.	http://ccta.net/_resources/detail/2/1
Contra Costa Measure J Transportation for Livable Communities	Contra Costa Transportation Authority	Every few years; the last round was 2016-2017	Competitive among Contra Costa County jurisdictions.	bikeways and crossing improvements.	http://ccta.net/_resources/detail/2/1
Transportation Fund for Clean Air, County Program Manager Fund	Contra Costa Transportation Authority	Annually (last submittals were due in April 2017)	Funds bicycle facilities, including paths, lanes, routes, lockers and racks. The Regional Fund is competitive among Bay Area jurisdictions; the County Program Manager Fund is competitive among Contra Costa County jurisdictions.	Bikeways and bicycle crossing improvements.	www.baaqmd.gov/
511 Contra Costa Bike Rack and Locker Program	511 Contra Costa	Ongoing (applications reviewed on a first-come first-served basis). Subject to availability of funds.	Reimburses 50% of the cost of purchasing and installing bike racks up to $500 per unit. Available to businesses, public agencies and non-profit organizations in Contra Costa County.	Bicycle parking racks and lockers (equipment but not installation)	511contracosta.org/employers/make-your-workplace-bike-friendly/locker-project/

Let's Keep Rolling!

This Plan provides a strategic plan for improving the bicycle environment in San Ramon. For next steps, the City should consider creating an annual action plan and developing performance measures to track progress in meeting the Plan's six goals. This annual action plan can be created in partnership with a newly-focused Bicycle and Pedestrian Advisory Committee, as recommended in Chapter 4.

So let's keep rolling, San Ramon, towards a vibrant and thriving bicycle culture and safe community for bicycle riding for all purposes!

CITY OF SAN RAMON
BICYCLE MASTER PLAN

Appendix A. Public Outreach

As part of the Plan development process, a range of outreach and engagement strategies were used to gather input from the community on existing conditions, opportunities, and challenges related to bicycling in San Ramon. This Appendix summarizes the outreach efforts and the input received.

Bike to Work Day

On May 11, 2017 from 6:30-10:00AM, Toole Design Group (TDG) hosted an outreach table during San Ramon's Bike to Work Day event on the Iron Horse Trail. The purpose was to share information about the Bicycle Master Planning process with the community; gather input and ideas for the Plan; and share resources for further engagement via the City's project webpage and WikiMap.

The event was very successful. TDG staff spoke with over 75 people, including people commuting to work, riding for recreation, and students on their way to school.

Figure A.1. Participant at Bicycle Master Plan outreach table

Key Takeaways

Throughout the event, several themes emerged base on the public's input:

- Enthusiasm and excitement about the San Ramon Bicycle Master Plan
- Appreciation of the existing bike network, especially the Iron Horse Trail
- Support for an overcrossing on the Iron Horse Trail at Bollinger Canyon Road and Crow Canyon Road.
- Interest in stronger east-west connections; more connectivity between the trails on the east side of the city; and more bike lanes throughout the community.
- Interest in safer bicycle crossings at intersections/streets (as indicated through the "What's Most Important to You?" poster activity); interest in reducing delay for bicyclists at large, signalized intersections.

Outreach Materials

Several materials were shared at the outreach table as a way to educate the community about the planning process and gather input.

Map: Existing Bicycle Network in San Ramon

Participants were asked to share their ideas, feedback, and thoughts about the existing bicycle network in San Ramon. Some participants wrote and drew directly on the map while others had conversations with TDG staff. Staff transcribed the participants' comments directly on the map during those conversations.

Figure A.2. Existing Bicycle Network Map with comments

Recurring comments included:

- Improve intersection crossings at larger intersections (such as Crow Canyon Road, Norris Canyon Road, and Bollinger Canyon Road) and at smaller, neighborhood intersections.
- Fill in network gaps, such as along Old Ranch Road or Old Dougherty Road, and links between existing trails.
- Add bike facilities to Alcosta Boulevard to make this more comfortable for riders.

Activity: "What's Most Important to You?"

Participants were asked to place a dot next to the item that was most important to them to develop a safe and connected bicycle network in San Ramon. Some participants placed one dot on the poster, while others placed multiple ones.

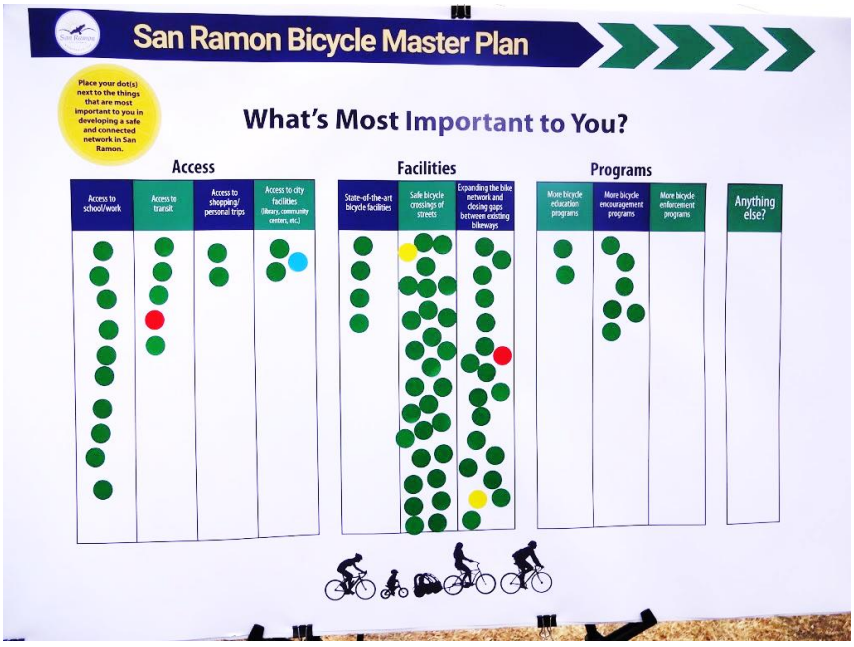


Figure A.3. "What's Most Important to You?" Poster with dots

The items that were most important to attendees at the Bike to Work Day event were:

- Safe bicycle crossings of streets (29 dots)
- Expanding the bike network and closing the gaps between existing bikeways (19 dots)
- Access to work/school (10 dots)

Other important programs/access considerations included more bicycle encouragement programs (six dots) and access to transit (five dots).

Activity: "What Type of Rider Are You?"

Participants were asked to place a marble in the jar that most accurately described them; their options included:

- "No Way, No How" – No thanks! I'd rather not ride a bike.
- "Interested but Concerned" – I enjoy riding my bike, especially on trails and shared use paths, but biking on roads makes me nervous.
- "Enthused and Confident" – I feel comfortable riding on quieter streets with bike lanes and on shared use paths.
- "Strong and Fearless" - I feel comfortable biking on any street with bike lanes, bike routes, and shared use paths.

The jars that had the most marbles at the end of the event were "Interested but Concerned" and "Strong and Fearless." In a national study[1], "interested but concerned" riders represent approximately 51% of the adult population; therefore, having a high number of "interested but concerned" participants is in keeping with many other communities.

Figure A.4. "What Type of Rider Are You?" marble activity

"Strong and fearless" riders typically represent 7% of the population; however, a higher representation of these riders was at the Bike to Work Day event. Most likely, the location attracted "strong and fearless" riders since the Iron Horse Trail is used by people who commute by bike, often from long distances or other communities.

[1] Source: Dill, J. McNeil, N. "Revisiting the Four Types of Cyclists: Findings from a National Survey" Transportation Research Board 95th Annual Meeting, 2016.

Poster: Project Schedule

To provide participants with a sense of the project schedule a process, a "Project Schedule" poster was on display at the event.

Handout: San Ramon Bicycle Master Plan

The Consulting Team encouraged participants to stay involved throughout the process and to continue to share their thoughts through the online WikiMap. A total of 50 handouts were given out.

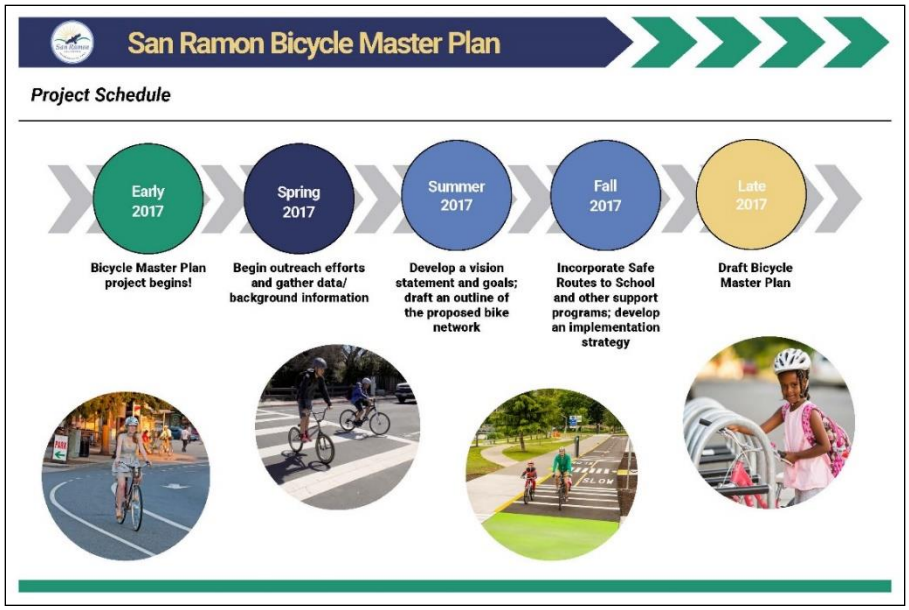


Figure A.5. Project Schedule Poster

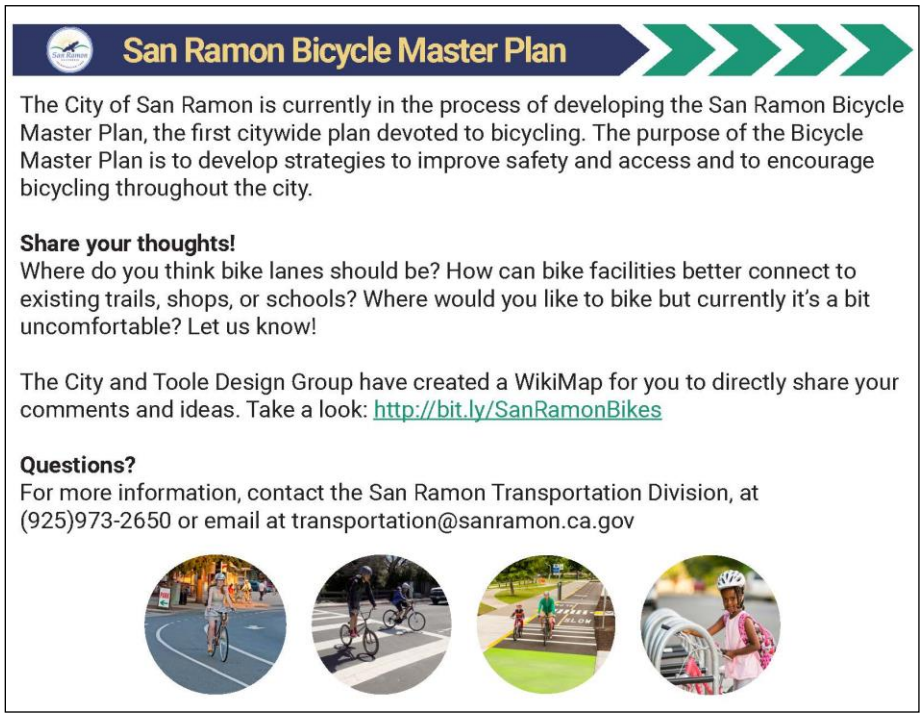


Figure A.6. Project Handout

WikiMap Response Summary

The WikiMap for the Plan was open from May 8, 2017 until August 31, 2017. The WikiMap is an on-line outreach tool that collected site-specific information on where participants experience bike-related issues, where they typically ride a bike, and where they would like to be able to ride a bike in the future. The data collected will be used to inform recommendations for policies, programs, and the locations and types of bicyclist-related infrastructure projects.

Survey Responses

Participants were asked for the following information:

1. Provide their demographic information such as their age, gender, and how often they ride a bike
2. Identify barriers to riding a bike
3. Identify destination where they currently ride a bike to
4. Identify where they would like to ride a bike to
5. Identify streets they currently ride on
6. Streets that they would like to ride a bike on

Their responses are summarized in the following sections.

Respondent Information

Respondents' Demographics

Approximately 130 individuals contributed to the WikiMap public outreach tool; however, not all respondents contributed to each individual section of the WikiMap. Demographic data collected (displayed below) indicates males are over represented accounting for 64 percent of survey respondents while 32 percent are female, as shown in Figure A.7.

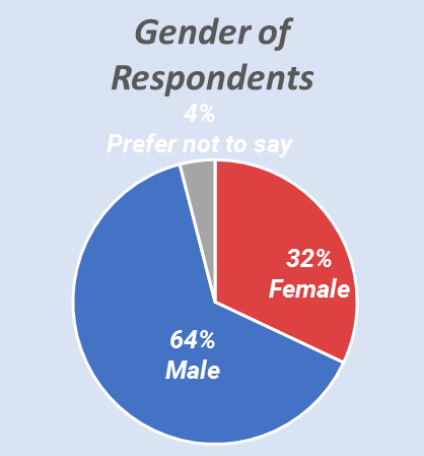


Figure A.7. Gender of Respondents

Additionally, age groups below the age of 41 and over 70 are underrepresented, accounting for 12 percent of all respondents; 86 percent of respondents were between the ages of 41 and 70, as shown in Figure A.8.

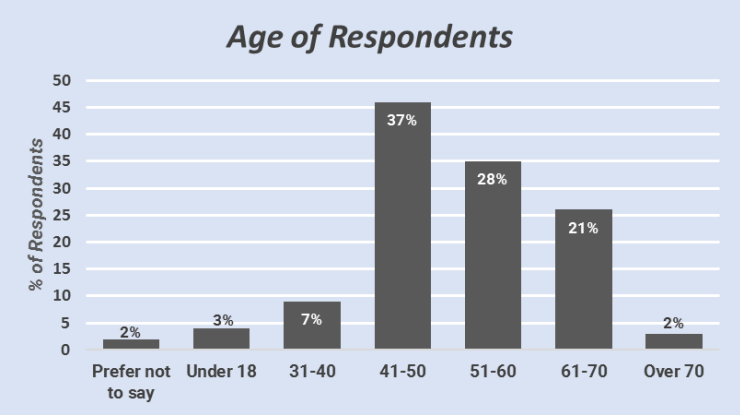


Figure A.8. Age of Respondents

Biking Characteristics

Survey respondents were asked to describe their biking habits and how often they ride a bicycle for recreation and for transportation purposes, such as commuting or errands. The majority of respondents classified themselves as being fairly confident to very confident. Two percent of respondents noted they do not wish to ride a bicycle, and 26 percent prefer to stay on trails.

More than half of the respondents (57 percent) stated they ride their bicycle at least once a week for recreation or exercise purposes. When asked how often respondents choose to ride a bike for transportation purposes, such as commuting or running errands, 49 percent responded they never use a bike for transportation purposes. However, 19 percent stated they use a bike for transportation purposes for one to six plus times a week. When looking at how often people ride for transportation purposes by gender, a higher proportion of females (70 percent) than males (36 percent) reported that they never ride a bike for transportation. Additionally, the male participant results have a more even distribution of respondents who do ride for transportation purposes among the different frequency categories. These characteristics are shown in Figures A.9, A.10, and A.11.

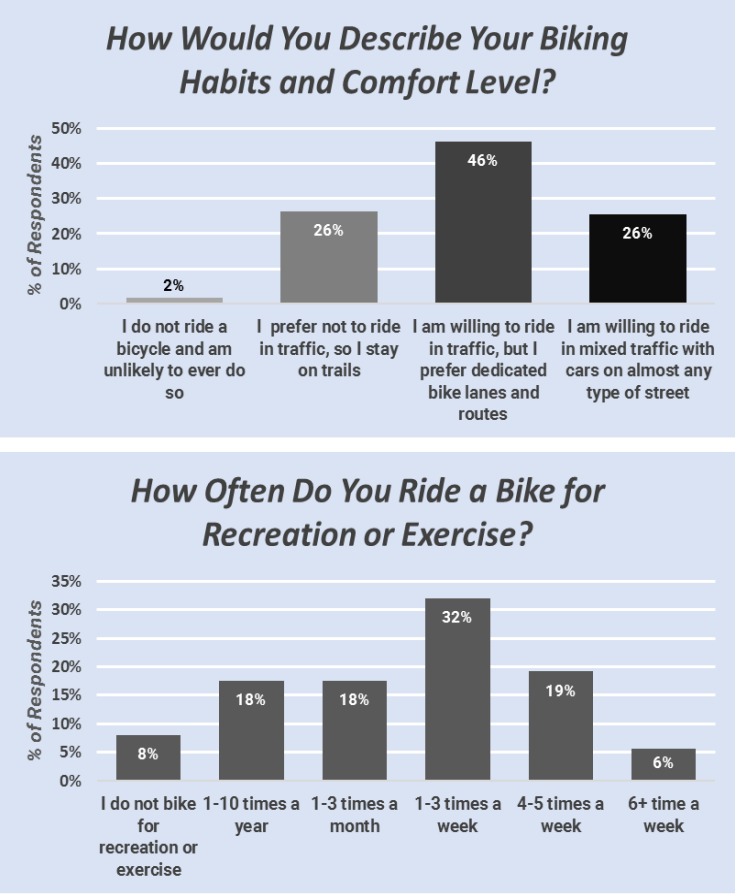


Figure A.9. Biking Characteristics – Habits/Level of Comfort and Frequency of Riding for Recreation

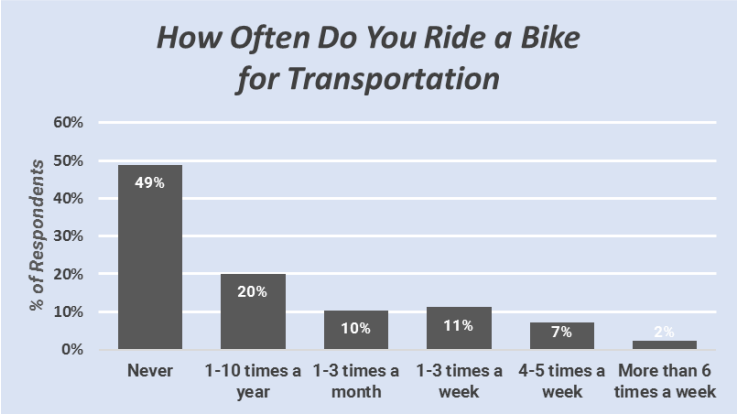


Figure A.10. Biking Characteristics – Frequency of Riding for Transportation

How often Do You Ride a Bike for Transportation by Gender				
Row Labels	**Female**	**Male**	**Prefer not to say**	**Grand Total**
Never	70%	36%	80%	49%
1-10 times a year	20%	21%	0%	20%
1-3 times a month	3%	15%	0%	10%
1-3 times a week	5%	15%	0%	11%
4-5 times a week	0%	10%	20%	7%
6+ times a week	3%	3%	0%	2%
Grand Total	**100%**	**100%**	**100%**	**100%**

Figure A.11. Frequency of Riding for Transportation by Gender

Barriers to Biking

Attendees were asked to identify locations where barriers to biking exist by placing a point on the WikiMap (see Figure A.12). After placing a barrier point on the map, users could enter a comment to describe the barrier. Typical comments include:

- Long wait times at traffic signals
- Dangerous motorist behaviors
- Lack of bike lanes and bike lane contiguity
- Poor connections to destinations
- Uncomfortable roadway designs

The barriers identified by respondents are geographically concentrated near downtown San Ramon with a few barriers located in the southern area of the city.

Traffic Signals

Traffic signals along Norris Canyon Road, Crow Canyon Road, and Bollinger Canyon Road were noted as having long signal durations that make riding a bike along these roadways inconvenient. Respondents noted that some of these traffic signals do not detect bicyclists. This means that bicyclists must wait until a motor vehicle arrives at the intersection to trigger the signal, or in some cases, the bicyclist will proceed through the intersection on red. Respondents suggested that all signalized intersections that have a bike lane must have signal detection appropriate for bicyclists.

Bollinger Canyon Road

Bollinger Canyon Road between Crow Canyon Road and Norris Canyon Road was identified by several survey participants as an uncomfortable street to ride a bike on. Comments suggested that the roadway is too narrow for motorists to pass bicyclists safely. One respondent chooses to ride on the sidewalk instead riding on the street. In reviewing the comments, there appears to be some confusion regarding the parking lane and whether it is a bike lane, parking lane, or a fog line.

Iron Horse Trail

Multiple respondents requested improved access to the Iron Horse Trail and increasing the width of the path to help improve comfort and safety of all trail users. Children often use the trail for walking and riding a bike. There is some concern about interactions between children bicycling on the trail and higher speed adults bicycling on the trail.

The number of pedestrians and bicyclists using the Iron Horse Trail between Bollinger Canyon Road and Norris Canyon Road creates an uncomfortable and inconvenient environment for the current width of the path. Bicyclists must zig-zag around pedestrians using the trail or stop and wait for a safe time to proceed around the pedestrians. Some respondents requested a separate path for pedestrians and bicyclists to eliminate these conflicts.

Several respondents stated that signalized intersections along the Iron Horse Trail have long wait periods. They also said that frequently the traffic signals do not detect bicyclists and pedestrians. This results in a bicyclists and pedestrians crossing through the intersections without the right-of-way. The intersections along the Iron Horse trail at Bollinger Canyon Road and at Crow Canyon Road received the highest number of responses regarding long signal times and included requests for bike and pedestrian overpasses.

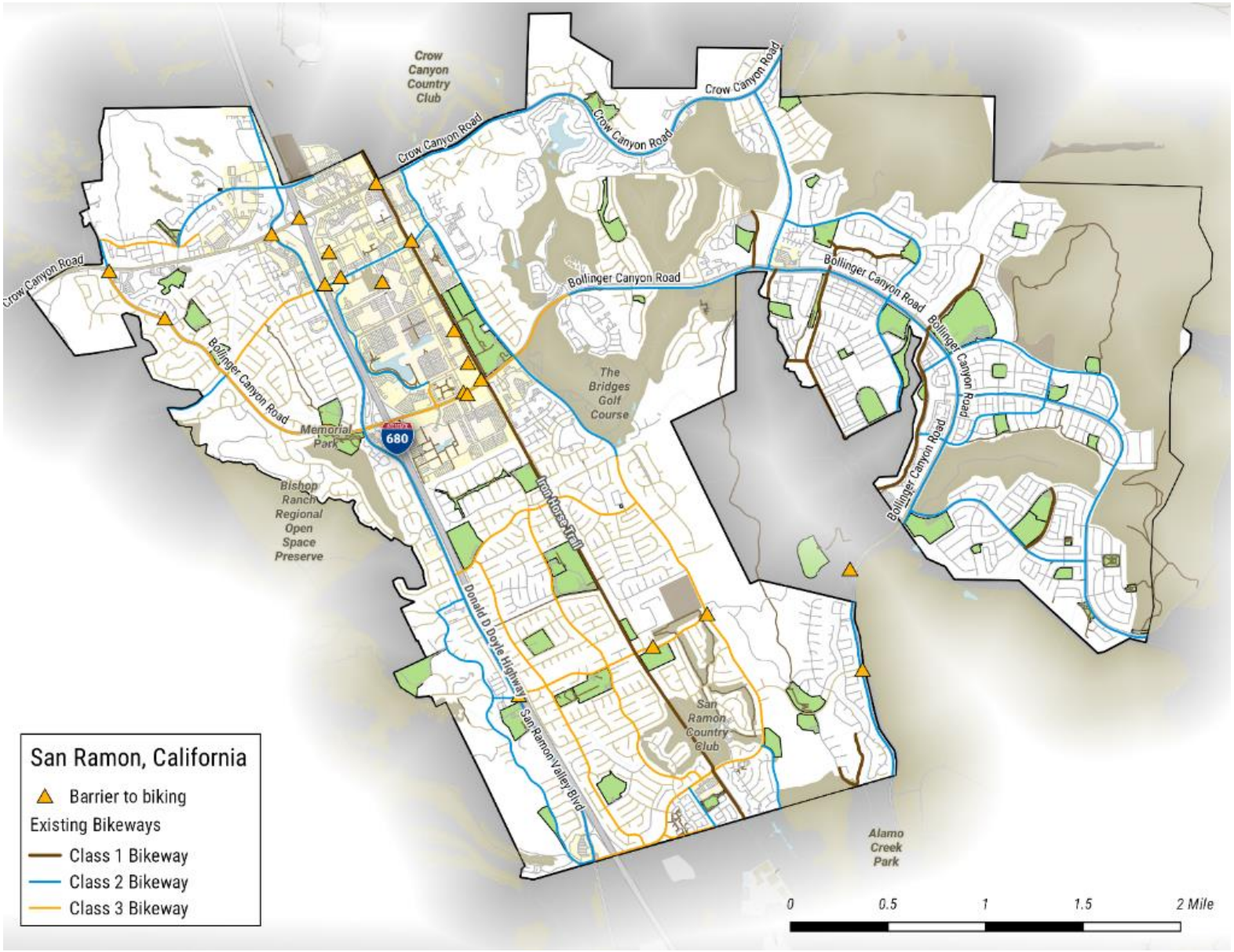


Figure A.12. Barriers to Biking

Places I Ride a Bike To

Survey respondents were asked to locate on the WikiMap where they currently ride a bike to – see Figure A.13. The destinations are geographically concentrated near downtown San Ramon. Most destinations include trips to grocery stores, office buildings, restaurants, park-n-ride centers, and schools. Some comments stated that Peet's Coffee Shop is a very popular destination for groups of recreational bicyclists in San Ramon and surrounding communities.

Streets I Ride a Bike on

Street segments were also identified by respondents as streets that they currently ride. Some participants stated that they ride on San Ramon Valley Boulevard as an alternative to the Iron Horse Trail due to the wide shoulders. Several respondents stated that they feel much safer on roads with wide shoulders than on roads without them.

San Ramon Valley Blvd appears to be a complementary route to the Iron Horse Trail for more experienced bicyclists who choose to not ride on the trail. Some respondents ride on Bollinger Canyon Road south to the Dublin BART Station and use Old Ranch Road and Alcosta Boulevard to avoid current construction on Dougherty Road. Several comments requested bikeway improvements to Bollinger Canyon Road and Dougherty Road.

Many participants said they ride on the Iron Horse Trail to access shops, for recreation, commuting to work, and to ride with their children. East-west roads such as Executive Parkway, Bollinger Canyon Road, and Norris Canyon Road are used as connector routes to get to and from destinations by bicyclists using the Iron Horse Trail.

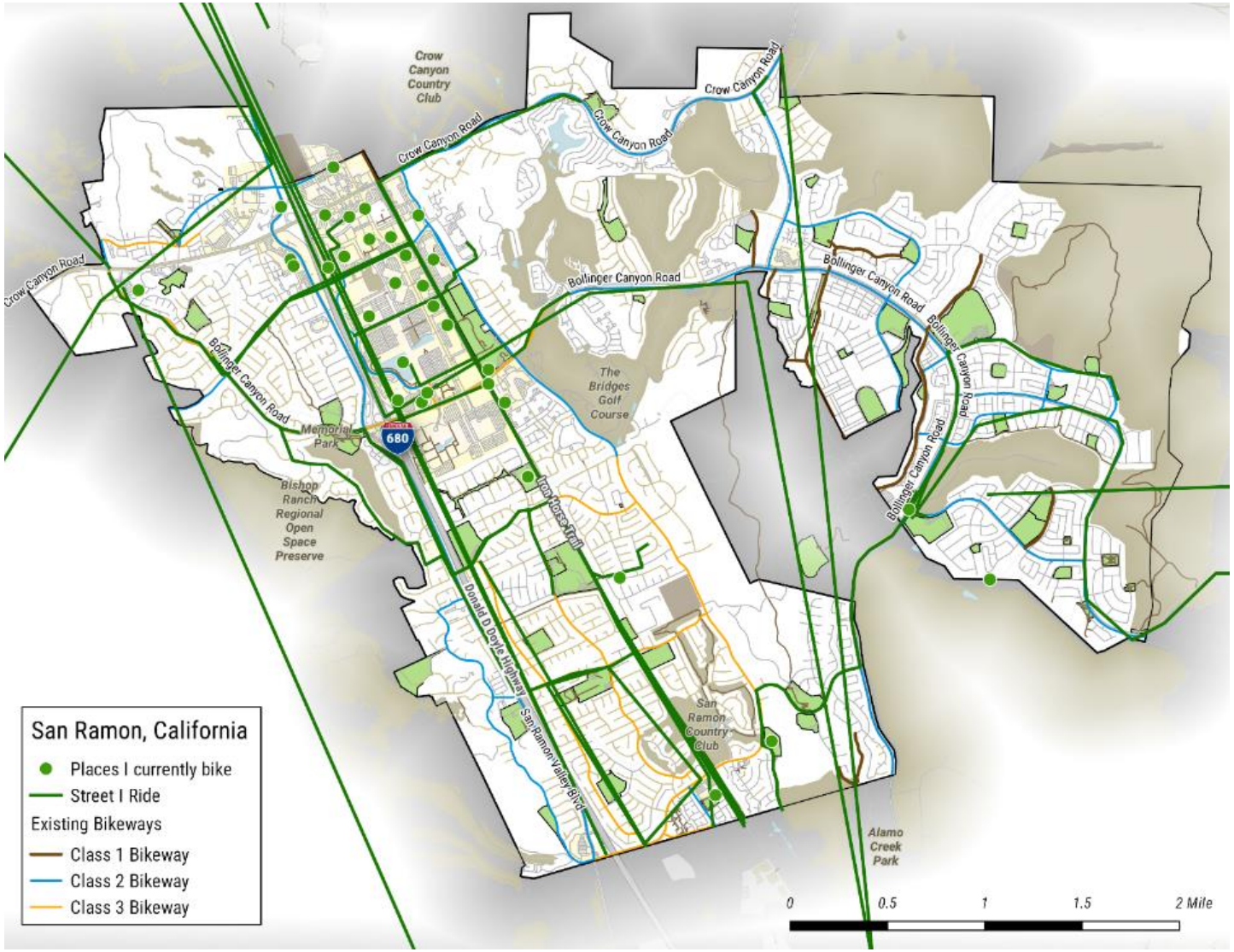


Figure A.13. Places and Streets I Currently Ride

Places I Would Like to Bike To

Survey participants were asked to add points onto the WikiMap and record the name of places they would like to ride their bike to as well as any additional comments they wish to contribute (see Figure A.14). Accessing downtown San Ramon, shopping centers, and restaurants are reported as being difficult and uncomfortable to get to by bike. Traveling on Sunset Drive was specifically called out as being uncomfortable and that getting to the City Center from San Ramon Valley Boulevard is difficult.

Several respondents stated there should be more paved bike paths to destinations because existing gravel paths do not support riders of all ages, abilities, and bike types (commuter bike, road bike, etc.). Respondents suggested paved paths connecting Alcosta Boulevard to Rancho Park and upgrading the gravel path at Dougherty High School.

Streets I Want to Ride a Bike On

Difficulty accessing the Iron Horse Trail, downtown San Ramon, and the shopping centers were common issues identified in the WikiMap responses. Many respondents commented that the lack of safe bike infrastructure and a fragmented bikeway network discourages them from choosing to ride on the "streets I want to ride," as shown in Figure A.14. A new bidirectional side path was suggested alongside Camino Ramon between Crow Canyon Road and Bishop Ranch 1 by one respondent who stated they are uncomfortable riding on Camino Ramon.

Many respondents said that Bollinger Canyon Road is unsafe to ride a bike, and many people said they often ride their bikes on the sidewalk which has led to conflicts between bicyclists and pedestrians. Installing bike facilities along Bollinger Canyon Road from San Ramon Valley Blvd to Canyon View Circle would help connect people to popular destinations. Currently, many people who ride their bikes on the sidewalk along Bollinger Canyon Road said that the slope of the sidewalk is too steep and narrow for bicyclists and pedestrians to share. Additionally, due to the absence of bike facilities, participants feel there is not a safe, comfortable, and inviting connection along Bollinger Canyon Road to access the Iron Horse Trail or to the shopping center.

Two comments suggested adding a bike lane on Alcosta Boulevard south of Veracruz Drive because motorists fail to give people riding bikes enough space. Participants commented that adding a bike lane will help delineate the roadway and create separate spaces for motorists and bicyclists while contributing to a more comfortable and safe environment to ride a bike.

Several respondents stated that they would like to ride to and from the Dublin Pleasanton BART Station in East Dublin. However, several gaps in the bike lanes along that route prevent them from feeling comfortable enough to do so. Additionally, the current construction along Dougherty Road has created an uncomfortable and time-consuming experience for people riding bikes.

Several segments were drawn outside of the San Ramon city limits. Multiple comments requested protected bike lanes on Camino Tassajara from San Ramon to Danville. One respondent said that they are too uncomfortable to ride with their family along Bollinger Canyon Road from San Ramon to Las Trampas to access the parks and trails due to the lack of safe bike facilities.

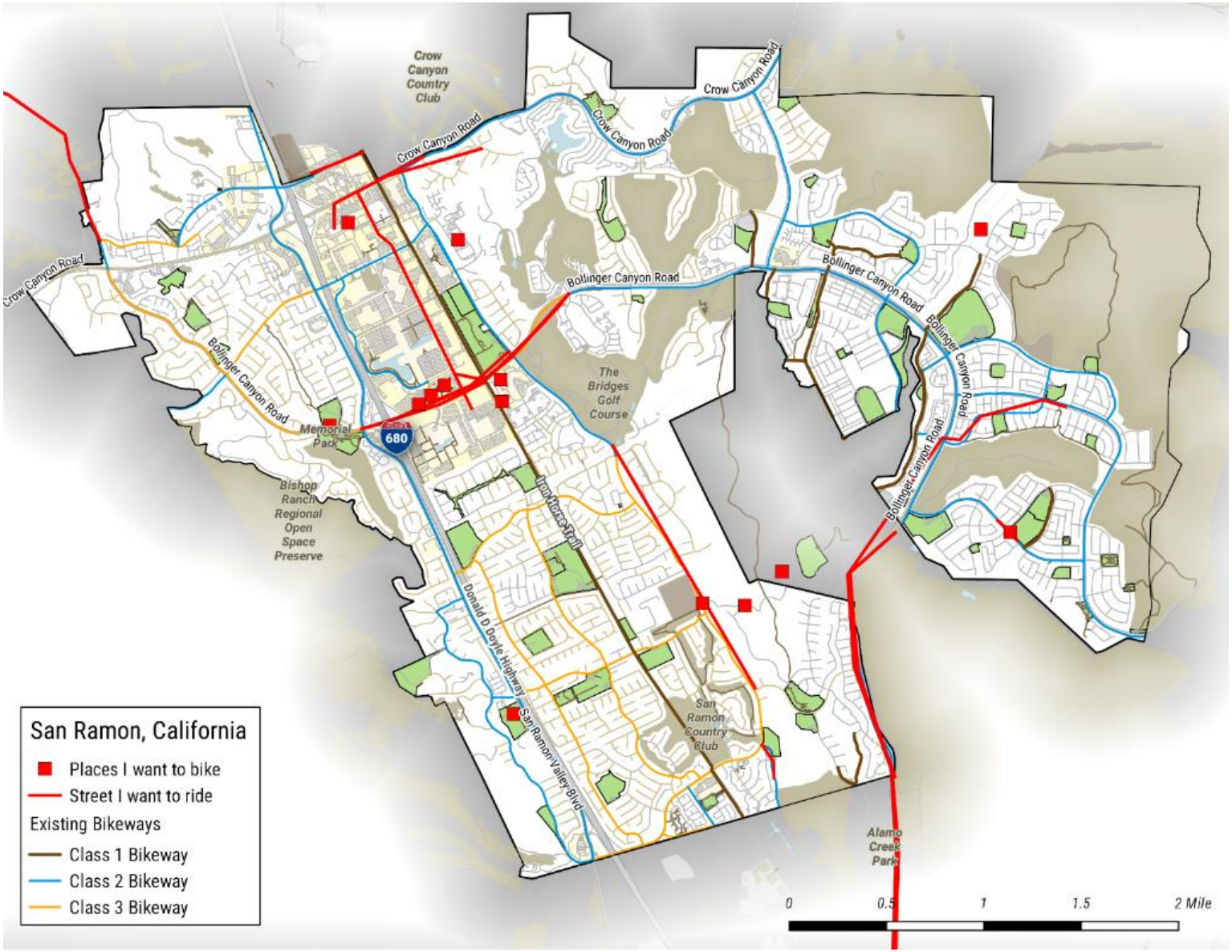


Figure A.14. Places and Streets I Want to Ride

Tour of City Facilities

On June 22, 2017, members of the San Ramon Bicycle Master Plan Subcommittee, City staff, and Toole Design Group took a tour of the City to observe and discuss the existing bicycle facilities and ideas for improvements. Participants were asked to note their ideas and observations on maps, which were collected by Toole Design Group at the end of the meeting.

The following is a summary of observations from the tour, organized by stop location. The tour began and ended at the San Ramon Permit Center (2401 Crow Canyon Road).

Figure A.15. City tour route map

Stop 1: Hyatt House Parking Lot (2323 San Ramon Valley Road)

Objective:

- Review bike lane configuration along arterial roadway.

Observations:

- Bike lanes drop in advance of the intersection. Cyclists have to jog over to bike lane between the right turn lane and through lane.
- Conflict with turning cars near Crow Canyon movie theater.
- San Ramon Valley Road:
  - Cars park in bike lane legally – "door zone" issues were noted
  - Main route for cyclists to Pleasanton and other cities.

Opportunities:

- Opportunity site for green paint through intersection to highlight the conflict zone. Suggestions were made to mark green paint in approach to intersection and make sure conflict areas are evident from a distance to drivers.
- Potential opportunity site for a bike box.

Stop 2: Norris Canyon Road/Annabel Lane Bus Stop

Objective:

- Review "Bike Conflict Zone" proposal

Observations:

- When traveling east-west, cyclists use Norris Canyon Road. Vehicle speeds along Norris Canyon Rd are not comfortable to bicycle in/adjacent to.
- Students use Norris Canyon Road to get to middle school; students sometimes ride on the sidewalk.
- Sometimes bicyclists are observed riding in the wrong direction.
- Difficult for cyclists to make left, southbound turn because of the double left turn lanes.
- Many "disappearing" bike lanes that end abruptly and start again after a bit of distance. Similar to Stop 1, bike lanes drop in advance of the intersection. Cyclists have to jog over to bike lane between the right turn lane and through lane.
- 24-hour driveway before Annabel Lane often results in conflicts between drivers and bicyclists

Opportunities:

- Opportunity site for green paint through intersection to highlight the conflict zone.
    - Green paint may be used to make bike lanes more visible and to allow kids/students to feel more comfortable during rush hour
- A suggestion was made to convert a section of sidewalk into a multi-use path (Bishop Ranch owns the sidewalk here).
- CIP has designs for Annabel Lane/Bishop Drive.
- Annabel Lane has a lane/gate that connects to the shopping center (Crow Canyon Commons).

Stop 3: San Ramon Transit Center (701 Executive Pkwy)

Objective:

- Review Transit Center Access (Bike Racks, Lockers, Trail Access)

Observations:

- Many children meet their parents for pick-up after school at the Transit Center.

Stop 4: Bollinger Canyon Road Fountain (Bollinger Canyon Rd & S. Chanterella Dr.)

Objective:

- Review Proposed "Bike Cycle Track" in Median.

Observations:

- No option for bikes to go up or down the hill except for using the sidewalk/shared path – must share this with people who are walking and running.
- Eastbound on Bollinger Canyon Road is a large hill with a shared path – steep grade encourages cyclists to come down at high speeds and creates safety conflicts with pedestrians and other cyclists.
- The bicycle lane ends at the Bridges Golf Club and switches to a multi-use path/sidewalk on the opposite side.
- A K-rail has been installed along the shared use path which further constrains the path and limits the space for pedestrians and cyclists.

- The corridor between San Ramon Valley Blvd and the Iron Horse Trail is uncomfortable and challenging for most cyclists.
- On Camino Ramon: No bike facilities

Opportunities:

- Consider a "bicycle walk zone" on the multi-use path. *[Note that this would be very difficult to enforce and unlikely to improve safety.]*
- Camino Ramon – opportunity for dedicated facilities since this route is used by cyclists; also idea for a bidirectional protected bike lane on the west side; widen path, add paint and signage.
- Opportunity to connect bike path through the golf course and open spaces in this area.

Along Bollinger Canyon Road

Observations:

- The Dougherty Road/ Bollinger Canyon Road intersection presents bicycle/vehicle conflicts.

Opportunities:

- At Briar Oaks Drive and Bollinger Canyon Road – Green paint should be considered to make conflict areas more visible, especially on south side of Bollinger Canyon Road.
- Opportunity for restriping at Stoneleaf Rd/ Briar Oaks Drive/ Bollinger Canyon Road intersection. Currently markings for bike lane and right-hand turn lane could be confused – could be considered two right-hand turn lanes.
- Along Bollinger Canyon Road between Windemere Parkway and East Branch Parkway there are wide medians and excess ROW in shoulder. Opportunity to install separated bike lanes on the shoulders – City owns this land (was thought that rail line could go here years ago).

Stop 5: Stoneleaf Road near Old Dougherty Road

Objective:

- Review Future Bicycle/Pedestrian Path

Observations:

- Old Dougherty Road is closed to motor vehicle traffic; this is being converted into a bicycle/pedestrian path – scheduled to open by September 2017.
- Will connect near the new shopping center (Village Center).
- The path will run adjacent to Bella Vista Elementary School and Rancho Park; however, there is no connection from the path to the school/park.

Opportunities:

- Opportunity to connect from Rancho Park to Pine Valley Road to close gap/create more connections.
- Opportunity to connect bike loops within park to other destinations.
- Opportunity to create a connection between path on Watermill Road through the Village Center to Bella Vista Elementary School.

Stop 6: Live Oak Elementary School Parking Lot

Objective:

- Review School Site Bike Lanes

Observations:

- Bike lane is not marked and is often confused for a right-hand turn lane by drivers.
- Lots of vehicle drop-off and pick-up at Live Oak Elementary School.
- On Bollinger Canyon Road south of East Branch Parkway, the bike lane conflicts with right-turn lane into community center. This is especially difficult for cyclists that are turning left onto

Bollinger Canyon Road from East Branch Parkway because of conflicts with cars turning right into community center.

Stop 7: Old Ranch Road near **Alcosta Blvd**

Objective:

- Review Proposed Bike Lane

Observations:

- Old Ranch Road has no bike lane – southern-most connection to the Iron Horse Trail

Stop 8: Bellemeade Dr near Alcosta Blvd

Objective:

- Review Bike Accommodations

Observations:

- On Alcosta Boulevard, between Brockton Avenue and Davona Drive, near the Vintner apartments – people are parking in the bike lane – concerns were shared about cyclists in the door zone.

Opportunities:

- Alcosta Boulevard, between near the Winged Foot Road and Iron Horse Trail, is a divided road that has a median and a parking lane and is signed as a bike route. Opportunity for a protected bike lane.

San Ramon Valley Road

Observations:

- On San Ramon Valley Road, there are three on-ramps to the freeway that are difficult for cyclists to navigate through.

Bollinger Canyon Road (to the west)

Observations:

- Cars park in the bike lanes near the condos.

Opportunities:

- CIP has a project to shrink the large medians and add bike facilities.
- A recommendation was shared to make bike lanes more visible.

Additional Observations

- Need connections between Iron Horse Trail and City Center/establish more bike-friendly, comfortable routes near City Center.
- Throughout the city, signal timing loops have difficulty detecting cyclists. Public Works staff can make the loops more sensitive so they will pick up cyclists; Public Works needs to know the locations to do this – can also paint on the road to show were the cyclists should go to activate the loops.
- It is legal to ride on sidewalk throughout city.
- Regarding the area near California High School and Neil Armstrong High School – recommendation to install bike lanes in this area, lots of traffic congestion during school year, can be reduced by students feeling more confident to ride.
- At Dougherty Road and Bollinger Canyon Road, the bike lane disappears at the intersection.
- Consider a focused application of green paint around school areas and parks for both students and drivers – will help to create safe places for kids/students to ride.

Community Workshop #1

On October 19, 2017, the City of San Ramon, with support from Toole Design Group (TDG), hosted a community workshop for the San Ramon Bicycle Master Plan. The workshop was held in the EOC Room at the San Ramon City Hall. This section provides a summary of the activities and comments received at the meeting.

The purpose of the workshop was to share information on the Bicycle Master Plan process, familiarize the community with different types of bicycle facilities and treatments, and gather input on the community's priorities and reactions to the initial set of bike network recommendations.

The meeting began with a presentation from Lisa Bobadilla, the Transportation Division Manager for the City of San Ramon, and TDG staff. An overview of the plan process, bicycle facilities and the draft bicycle network was provided. Afterwards, attendees were invited to share their feedback on the draft bicycle network; vision, goals, and objectives; and a values activity titled "What's Important to You?"

Over 35 community members attended the event, including Subcommittee, Planning Commission, and TAC members; bike commuters; recreational riders; and families.

Figure A.16. Participants commenting on map of proposed bicycle network

Key Takeaways

Throughout the event, several themes emerged based on the public's input:

- Enthusiasm and excitement about the San Ramon Bicycle Master Plan
- Appreciation of the existing bike network, especially the Iron Horse Trail
- The needs and opportunities for:
    - Safer, more visible bicycle crossings at major intersections, I-680 freeway interchanges and roadway crossings along the Iron Horse Trail
    - Improved east-west connections, particularly along Bollinger Canyon Road
    - Reducing bicycle delay at intersections
    - Short-term, interim solutions with treatments like green paint
    - Placemaking in the City Center and Bishop Ranch areas
    - Regional connections
- Interest in areas with high concentrations of children (e.g., school zones, apartment buildings, afterschool hangout areas)

Comments and Questions from Presentation

The following comments/questions were asked by attendees at the end of the presentation.

- Need regional connections beyond San Ramon to other communities
- At intersections, often takes a long time to get green light for bikes
- Improvements are needed at intersections to improve detection of bicyclists

- Green paint needed at Bollinger Canyon Road near City Hall to guide cyclists through the intersection to the bicycle facilities
- Concern about the widening of Bollinger Canyon Road; how does this reflect the City's Complete Streets policy?
- San Ramon Valley Blvd and Norris Canyon Road are difficult to ride on; also there is often debris on edge of roadway
- Need connections over freeways; people want to be able to access all of San Ramon
- What are the metrics for achieving the Plan's goals?
- Are special street sweepers needed for separated bike lanes?
- When developing the recommendations, did you consider collision data?
- Does the Plan include bicycle routes to schools?
- Have businesses been contacted as a part of this process?

Comments on Outreach Materials

Map: Proposed Bicycle Network in San Ramon

Participants were asked to share their ideas, feedback, and thoughts about the proposed bicycle network in San Ramon. Some participants wrote and commented directly on the map while wrote their comments on flashcards.

Key Takeaways

- Improve crossings at large intersections (such as Crow Canyon Road, Norris Canyon Road, and Bollinger Canyon Road) and at smaller, neighborhood intersections
- Improve east-west crossings over I-680
- Increase the visibility of bicyclists with treatments like green paint
- Need short-term, interim treatments before full build-out
- Comments predominantly focused in and around the Bishop Ranch Business Park

Figure A.17. Proposed Bicycle Network Map with comments

Intersection Comments

- Get more specific on intersection improvements (San Ramon Valley Boulevard intersections with Deerwood Road, Crow Canyon Road, Norris Canyon Road, and Bollinger Canyon Road)
- All east-west crossings at I-680 are difficult and uncomfortable to bike along
- Green paint on all highway overpasses is desirable
- Green paint!
- Bollinger Canyon Road & Dougherty Road
  - Consider two-stage turn for bikes
- Bollinger Canyon Road & Canyon Lakes Drive
  - Difficult, uncomfortable crossing
- Bollinger Canyon Road & Alcosta Boulevard
  - Needs green paint
  - Manhole – slipping hazard
  - Bad
  - Drivers block intersection, especially for right turns
- Crow Canyon & Iron Horse Trail
  - Short-term enhancements: signage and visibility
  - Very important crossing that needs immediate safety and access improvements
- Iron Horse Trail & Alcosta Boulevard
  - Bad intersection
- San Ramon Cross Valley Trail & Davona Drive, Broadmoor Drive
  - Raised crossings
- Davona Drive & Pine Valley Road

    - Busy at school
- Alcosta Boulevard & I-680
    - Avoid!
    - Difficult and uncomfortable to bike through
    - Needs green paint on overpass
- San Ramon Valley Boulevard & Montevideo Drive
    - Need safer school drop-offs with more separation between students and cars
- San Ramon Valley Boulevard & Bollinger Canyon Road
    - Signal for left turn does not work for bicycles (heading east)
- Fostoria Way & Camino Ramon
    - Only stop signs – not safe for bicyclists
- San Ramon Valley Boulevard & Deerwood Road
    - Needs improvements for bicyclists and pedestrians
- Norris Canyon Road & Iron Horse Trail
    - Needs improvements for bicyclists and pedestrians
- Norris Canyon Road & San Ramon Valley Boulevard
    - Signal does not detect cyclists
- San Ramon Valley Boulevard & Deerwood Road
    - Needs improvements for bicyclists and pedestrians
- Crow Canyon Road & San Ramon Valley Boulevard
    - Need better connections
- Crow Canyon Road & I-680
    - Not a safe or comfortable place for bicyclists

Segment Comments

- Camino Tassajara (Windemere Parkway – Dublin/Pleasanton)
    - Need coordination with county between cities
- Bollinger Canyon Road
    - Are there <u>any</u> interim improvements we can make on Bollinger?
- Iron Horse Trail
    - Need better signage for trail etiquette
    - Bollards need better markings to be visible
- Alcosta Boulevard
    - Ride mostly use the frontage road
    - Better when riding north because no right turns
- Market Place
    - No dedicated bike lanes
    - Cars block intersection
    - Drivers don't look right – conflict
- Norris Canyon Road (Bollinger Canyon Road to San Ramon Valley Boulevard)
    - Narrow because of cars parking
- Crow Canyon Road (east of Iron Horse Trail)
    - Need short-term recommendation here
- Camino Ramon (south of Crow Canyon Road)
    - Two lanes merge into one – no space for cyclists; curb immediately; glass; potholes
    - Fix!
    - Not a safe place for cyclists to ride
- Crow Canyon Road (east of Deerwood Road)
    - Lots of kids in apartments
- Crow Canyon Road is not a safe or comfortable place for cyclists to ride
- Bollinger Canyon Road is narrow with island of grass
- Bollinger Canyon Road (north of Crow Canyon)
    - No bike lanes

    - Lots of bike traffic to Las Trampas – no bike lanes
    - Traffic flies fast – very unsafe
    - Lots of traffic, cars go very fast, need better protection, popular bike route
- Need lighting on the Iron Horse Trail; can feel unsafe, especially for female riders (could put in solar)

Site-Specific Comments

- Northern Bishop Ranch
    - Lots of kids use area
- Crow Canyon Gardens
    - Need safe access

Index Card Comments

- Dedicated traffic lights for bikes
- For right turns – separated bike lanes at the intersection at least
- Bicycling to a San Ramon destination
    - Parking a bike for a long time (lockers)
    - Security
    - Safety
- All I-680 crossings (east-west) are not safe or comfortable places for cyclists to ride (i.e., Crow Canyon, Bollinger, Alcosta)
- Focusing on intersections is very important
- Like green painted lanes – helps cyclist and drivers know where to go (and very cost effective)
- Like what Dublin has done near Ross

Activity: "What's Most Important to You?"

Participants were asked to place dots next to the items that are most important to them to develop a safe and connected bicycle network in San Ramon.

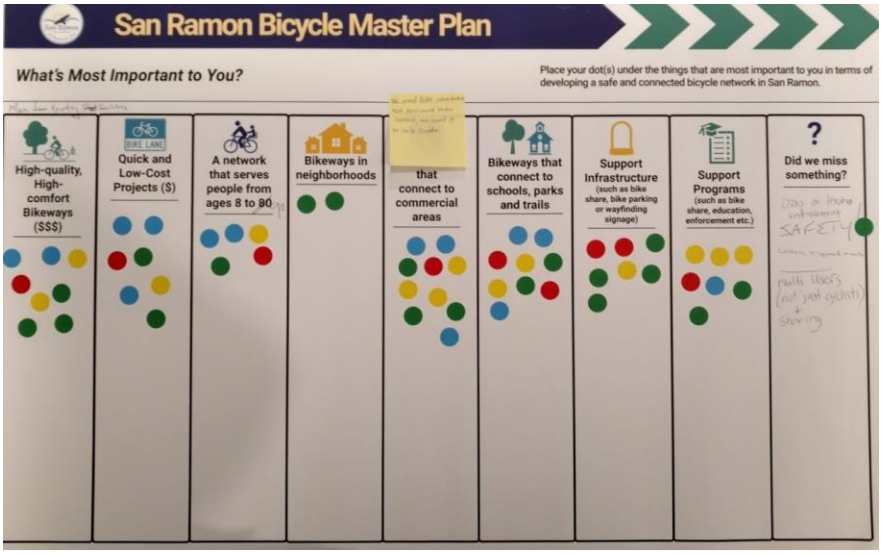


Figure A.18. "What's Most Important to You?" Activity

Attendees indicated that most items were equally important, with a fairly even distribution of dots among the categories. The items that were most important to attendees (i.e., received seven or more dots) were:

- Bikeways that Connect to Commercial Areas (10 dots)
- Bikeways that Connect to Schools, Parks and Trails (9 dots)
- High-quality, High-comfort Bikeways (8 dots)
- Quick and Low-cost Projects (7 dots)
- Support Infrastructure (7 dots)
- Support Programs (7 dots)

Comments shared under "Did we miss something?" and on Post-It notes included:

- Maintain existing facilities
- A network that serves people from ages 8 to 90
- We need bike infrastructure that does more than connect; we need it to help create commercial areas
- Dogs on leashes enforcement
- Safety!
- Lockers as opposed to racks
- Many facilities have multiple users (not just cyclists); need to consider the sharing of facilities

Poster: Project Schedule

To provide participants with a sense of the project schedule process, a "Project Schedule" poster was displayed at the workshop.

The poster had one comment on a Post-It note which recommended a new photo for the fourth image because concern that image was not a good safety example.

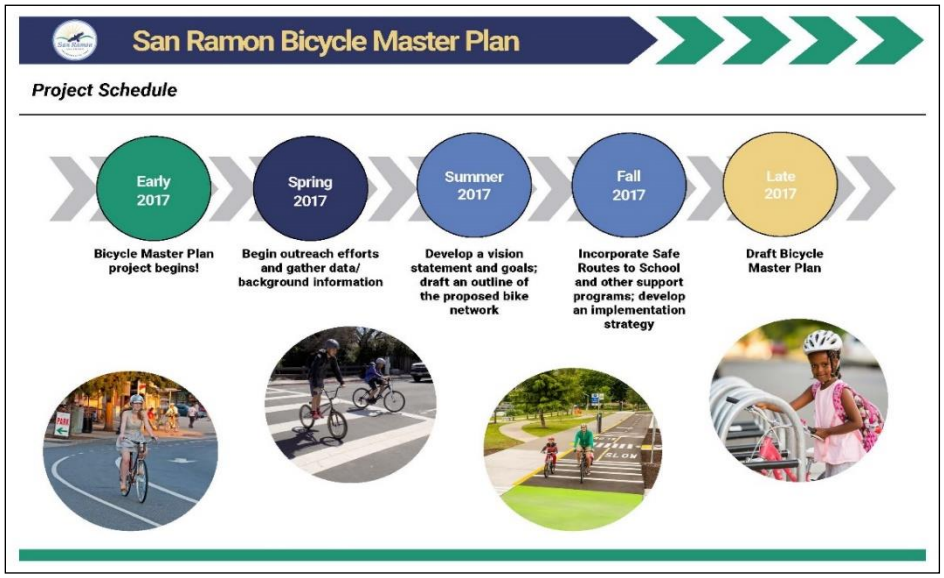


Figure A.19. Project Schedule Poster

Poster: Vision Statement

A "Vision Statement" poster was displayed during the workshop to inform participants of the long-term desired outcomes of the project.

The poster had one comment on a Post-It note which included:

- Can we expect a separate pedestrian plan? This should be an opportunity to create safe intersections and complete streets for all users.

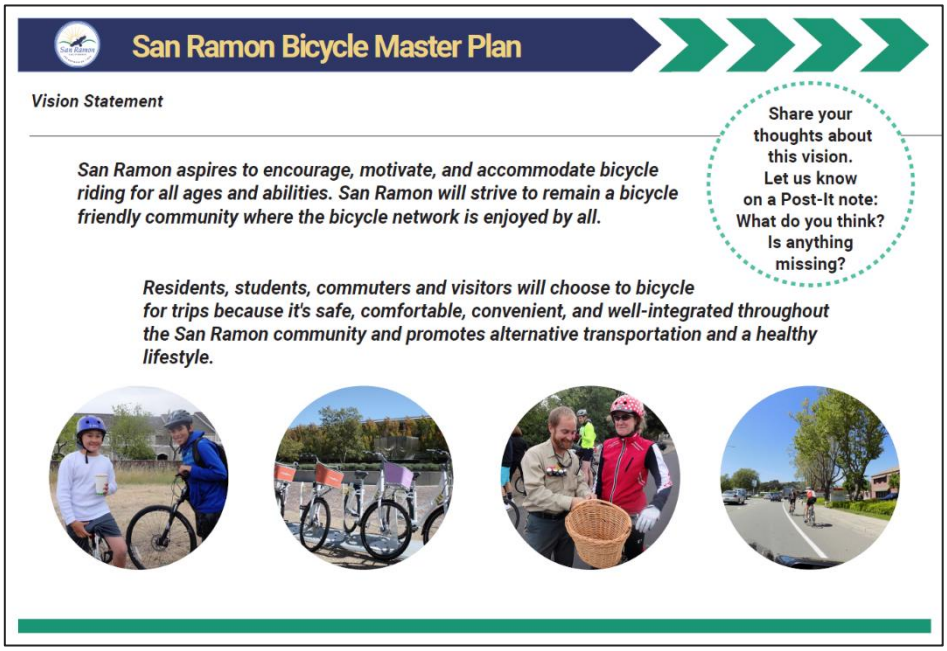


Figure A.20. Vision Statement Poster

Poster: Goals and Objectives

The purpose of the "Goals and Objectives" poster was to gather feedback from attendees on the draft goals and objectives.

Comments shared on Post-It notes included:

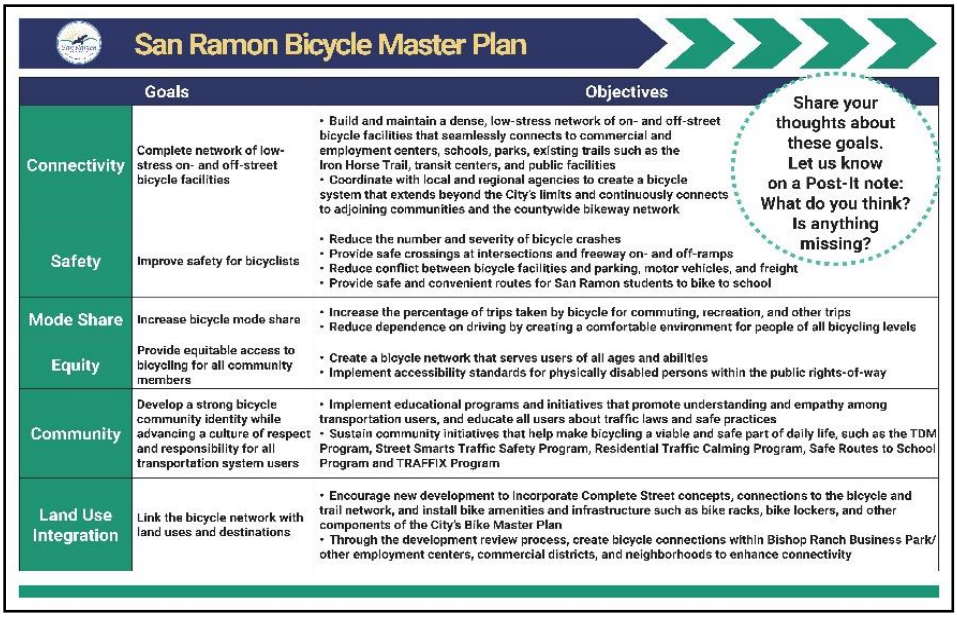


Figure A.21. Goals and Objectives Poster

- It would be helpful to understand how the Bike Master Plan helps to meet these objectives and some sort of performance measures to help monitor and measure the success of the plan.
- Promote safety and utility. Get us out of our autos and commit to the bicycle.
- Bishop Ranch Business Park is one central location. How about focusing supporting the creation of a vibrant city center vicinity (Bishop Ranch, City Hall, the Market Place, the library)?
- Bicycle infrastructure can do more than connect places. It can create places. Let's focus on supporting the creation of places and enhancing "collision density."
- Use of Bishop Ranch's well-maintained path in the middle of its property adjacent to the new city center could serve as a nice gateway.

Community Workshop #2

On March 8, 2018, the City of San Ramon, with support from Toole Design Group (TDG), hosted a second community workshop for the San Ramon Bicycle Master Plan. The workshop was held in the EOC Room at the San Ramon City Hall. This section provides a summary of the activities and comments received at the meeting.

The purpose of the workshop was to gather public input on the draft Plan (including the proposed bicycle network, prioritized project list, and support programs), and share information on the Plan implementation process with the community.

Figures A.22. Participants at the second Community Workshop

During the first 15 minutes of the workshop, participants were free to circulate to various posters and activities set up throughout the room. Posters and activities included:

- Project schedule poster
- Bikeway facility types informational poster
- Project vision and goals posters
- "Let Us Know Why You Bike!" activity
- Interactive public review of the recommended bicycle network map
- Prioritized projects list
- Proposed support programs

This was followed with a 30-minute presentation from Lisa Bobadilla, the Transportation Division Manager for the City of San Ramon, and TDG staff. A background on the Plan process was presented, along with an introduction to the draft Bicycle Master Plan and overview of the network recommendations, prioritized project list, support programs, and implementation strategy. The presentation concluded with a question and answer session. Afterwards, attendees circulated throughout the room and participated in activities.

Approximately 40 community members attended the event, including Subcommittee and TAC members; bike commuters; recreational riders; and families.

Figures A.23. Participants discuss the network recommendations at the second Community Workshop

Key Takeaways

Throughout the event, several themes emerged based on the public's input. They are similar to the key takeaways from the first public workshop:

- Enthusiasm and excitement for the proposed bicycle network and support programs
- Appreciation of the existing bike network, especially low-stress routes such as the Iron Horse Trail
- The needs and opportunities for safer and more visible bicycle crossings at major intersections
- Interest in regional connections

Comments and Questions from Presentation

The following comments/questions were asked by attendees at the end of the presentation.

- How long will implementation of the Plan take?
- How was the prioritized list of projects and programs developed?
- Safe access to the Iron Horse Trail is important.
- Has the cost of all projects and programs been estimated?
- Does this Plan include bike fix-it stations? Three stations are going to be constructed by Eagle Scouts.
- Like the bike racks that Pleasanton has installed that look like bikes.
- It's intimidating to use the bike lanes in South San Ramon, and it's difficult to get to the nicer bike paths.

- San Ramon Valley Boulevard should be a priority.
- Will bike paths have streetlights? Will it be possible to ride at night?
- Is there a way for the public to keep track of construction?
- Consider an annual action plan.
- Many bicyclists/pedestrians use the Iron Horse Trail between Norris Canyon Road and Bollinger Canyon Road.
- Need more bike parking at City Hall.
- Need protected intersection treatments.

Comments on the Proposed Bicycle Network Map

Participants were asked to share their ideas, feedback, and thoughts about the proposed bicycle network in San Ramon by writing their comments directly on the map.

Map comments:

- In neighborhood south of Bollinger Canyon Road, west of intersection with Alcosta Blvd: Find a way to get bicyclists down the Homeowners Association Path.
- Program idea: Site assessment around each school for walking and biking access/safety
- Add discussion of signal activation loops / cameras that are checked on a regular basis. Thanks!
- High school - Enforcement issue - People parking in bike lane at high school and middle school - What short-term improvements could be made at schools?
- On Bollinger Canyon Road, near intersection with San Ramon Valley Blvd: Metal grate is slippery for cyclists when wet.
- Intersection of Crow Canyon Road and Iron Horse Trail: People running the light unintentionally
- Interest in downtown bike share
- Request to add street labels to map
- What's happening with Pine Valley Road? It needs improvement.
- San Ramon Valley Blvd, Bollinger Canyon Rd, Crow Canyon Rd - these should be the highest priorities
- At intersection with I-680 and Bollinger Canyon Road: Recommend improvements at ramp crossing and path
- Top of Bollinger to SR Community Center - Separate bike lane needed.
- Alcosta/RT to Bollinger - Dangerous for cars. Do not yield and turn without looking - they drive in bike lane.
- Speed limits too high on major arterials
- First comment: Issue report app that drops pin on Google map in locations of reported issue. Second comment: Danville has an app.
- Crow Canyon Road: Why is that not on the top priority list?

Appendix B. State of Bicycling in San Ramon

The State of Bicycling Report presents an analysis of existing conditions data that formed the basis for understanding the current issues and opportunities for bicycling in San Ramon. It includes the following sections:

- Planning Context and Current State of Bicycling
- Collision Analysis
- Existing Bicycle Network
- Opportunities

Planning Context

Land Use and Character

San Ramon is located in southern Contra Costa County, on the broad plains east of the East Bay hills and Lamorinda. The City is 18 square miles and, when combined with nearby Danville, Dublin, Livermore, and Pleasanton, make up the Tri-Valley Region. San Ramon is the newest city in the valley, incorporated in 1983. Its recent incorporation date as well as building off the suburban land use patterns of the time have resulted an auto-centric development and transportation pattern. This type of development, which often lacks short connections between land uses (such as residential and commercial) has resulted in a limited number of bicycle facilities which may discourage people from biking. As of 2015, only 0.3% of San Ramon residents biked to work; county-wide the rate 0.5%. The Bike Master Plan is an important opportunity to better understand what the community wants and needs to improve. The Bike Master Plan helps identify projects that would increase the bike mode split in a comprehensive way.

Demographics

San Ramon's population has been steadily growing, increasing from 67,000 to just over 74,500 between 2010 and 2015, based on American Community Survey data. Thirty percent of these residents are school-age children, and 9 percent are 65 or older (see Figure B.1).

The San Ramon General Plan 2035 estimates a buildout population of 96,174 and a buildout labor force (jobs) of 57,667 for the San Ramon Planning Area, based on California Department of Finance population numbers.

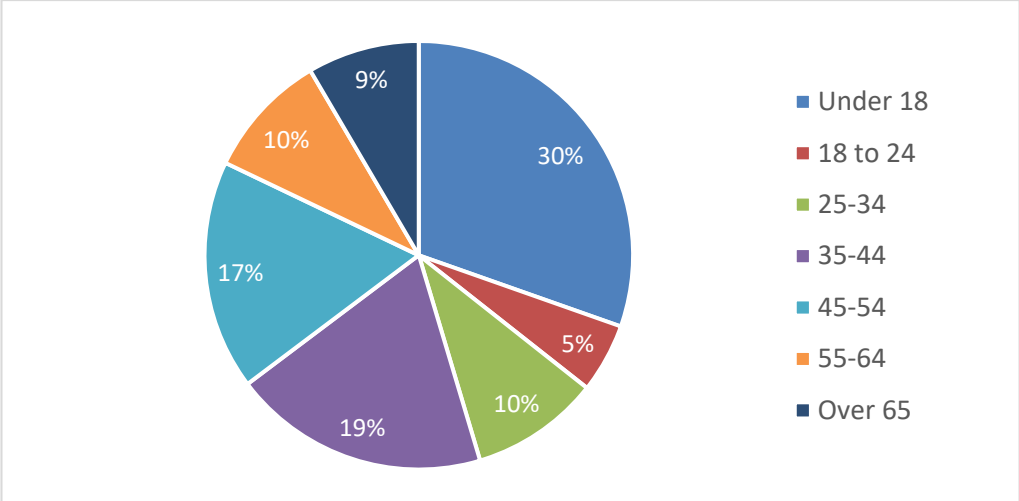


Figure B.1. Age of Residents in San Ramon

Given San Ramon's suburban land use patterns, only a small segment (3 percent) do not own a vehicle. Most households own two or more vehicles (see Figure B.2).

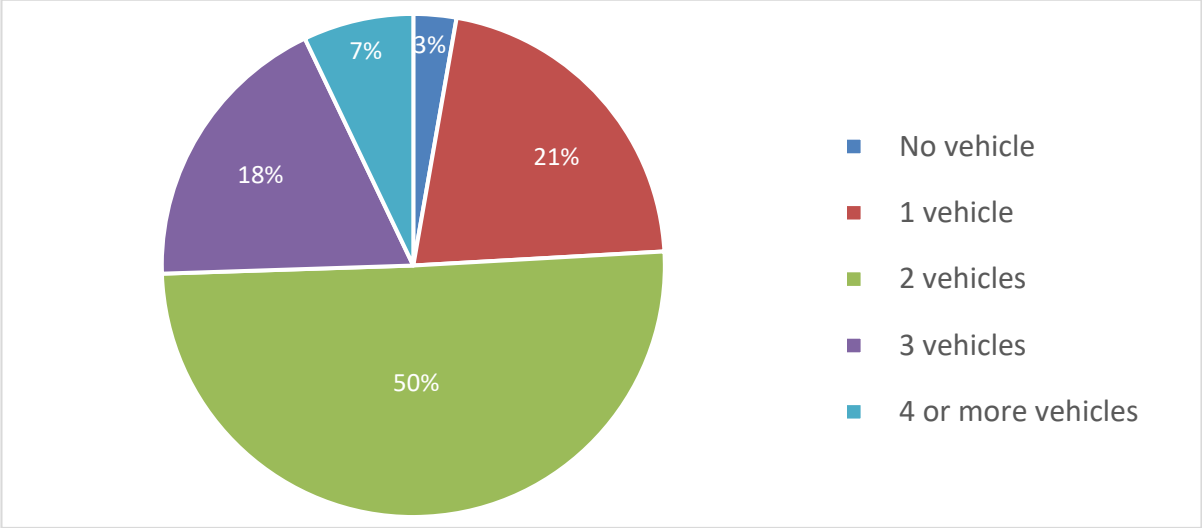


Figure B.2. Vehicle Ownership (Data Source: American Community Survey)

Travel Patterns

Most available travel data on San Ramon relates to commute trips. All data presented should be taken with the understanding that work-related trips generally only account for 10 to 15 percent of all trips.[1] Other trip purposes include visiting friends and family, errands, entertainment, outings, and recreation. Some of these other trip types are probably more likely to be taken by biking in San Ramon because they are located closer together. For instance, someone may drive to work because their job is located in

[1] Range references the National Household Travel Survey (15 percent) and California Household Travel Survey (9.9 percent).

another city whereas a social visit to a friend may be taken on bike because that friend lives in the same neighborhood, or the challenge of arriving "office-ready" is not an issue, if biking to work.

American Community Survey Work Travel Trends

A majority of San Ramon residents drive alone to work, as shown in the table below. Commuting by bike is extremely rare in San Ramon - less than half a percent do so. These trends are generally consistent with the county as a whole. Notably, a relatively high percentage of residents work from home (8.1 percent) which means they may take trips by bike from home at any time of day outside commute times and for purposes other than commuting.

Table B.1. San Ramon Commute Modes (Data Source: American Community Survey)

Mode	San Ramon	Dublin	Danville	Contra Costa County	California
Drove alone	76.3%	72.2%	78.2%	68.9%	73.4%
Carpooled	7.5%	7.9%	5.1%	11.6%	10.8%
Public transportation	5.4%	10.2%	5.7%	10.1%	5.2%
Walked	1.4%	1.7%	0.8%	1.7%	1.1%
Bicycle	0.3%	0.4%	0.3%	0.5%	2.7%
Other	1.0%	1.4%	0.9%	1.4%	1.4%
Worked at home	8.1%	6.2%	8.9%	5.8%	5.3%

In general, most residents of San Ramon have a fairly long commute - over half of residents commute for more than 25 minutes, and 30 percent commute for more than 45 minutes. These commute times are consistent with the small percentage of San Ramon residents that also work in the city (11 percent). Most of San Ramon's workforce live in nearby cities such as Danville, Concord, and Oakland, and are drawn to job opportunities at Bishop Ranch, where AT&T, Bank of the West, Chevron, General Electric, and other companies are headquartered.[2]

While the length of some residents' commutes may make biking a challenge or a less attractive option, about 10 percent of residents currently have driving, or vehicle, commutes of 10 minutes or less, and an additional 25 percent have driving commutes under 20 minutes. If these commutes took place by bike instead of car, they would take an hour or less (assuming average vehicle speeds of 30 mph and bike speeds of 10 mph). These shorter commute trips should be considered as opportunities for biking if existing infrastructure is modified to increase bicyclist safety, as perceived lack of safety is currently a large barrier to bicycling in San Ramon. Bicycle support facilities, such as secure bicycle parking, showers, and other end-of-trip facilities, may also be necessary to increase bicycle commuting trips.

[2] U.S. Census Bureau, Center for Economic Studies

Collision Analysis

This report aims to help City staff and the community better understand San Ramon's bike collision history, by analyzing collision severity, seasonality, geographic distribution, demographics, and primary collision factors.

Crash Severity

Over the eight-year period, there were 71 bike collisions, resulting in 69 injuries and two deaths. Overall, bike crashes were likely to be more severe than other modes, as shown in Figure B.3. It should be noted that the TIMS database only includes crashes where an injury was recorded – there are likely more property-damage-only crashes involving motorists, as well as non-injury bike collisions.

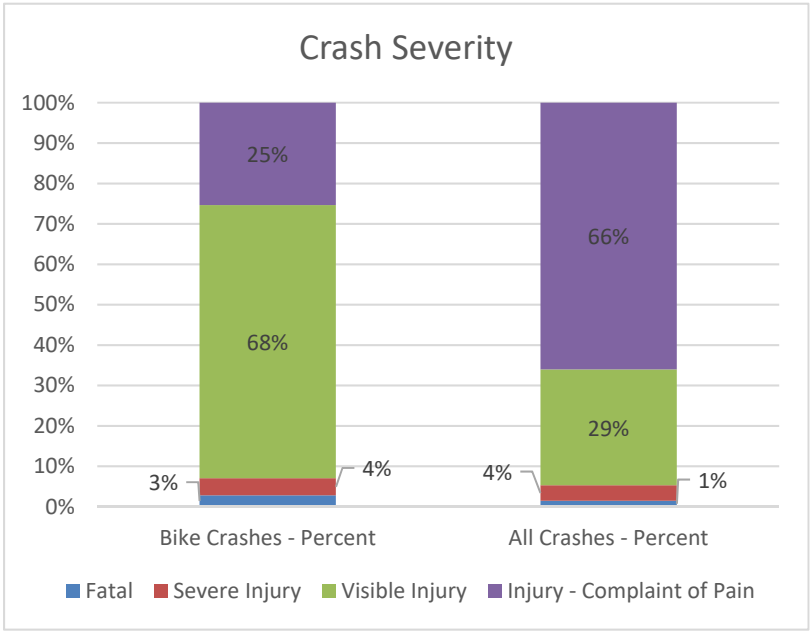


Figure B.3. Crash Severity in San Ramon (Source Data: TIMS)

Seasonality

There is a seasonality to San Ramon's bike collisions. Most occur in the summer and fall, with a slight peak in March (see Figure B.4). This could be related to recreational bicycling that occurs in the summer, in the temperate fall months and spring time. A spike in early spring collisions is often recorded, as new bicyclists make their first seasonal ride with the start of daylight savings time.

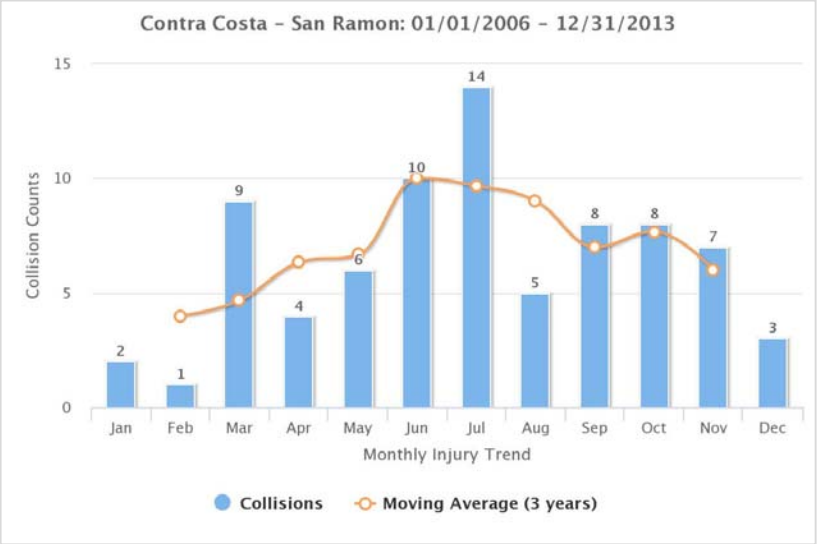


Figure B.4. Seasonality of Bicycle Collisions in San Ramon

Age and Gender

The demographic makeup of reported bike collisions is important when considering potential bike infrastructure improvements and educational programs. Over 40 percent of bike collisions that resulted in injuries involved a child under the age of 18. Given that only 30 percent of San Ramon's population is under 18, this demographic is overrepresented in the injury-producing bike crashes (at 43 percent), as are bicyclists aged 18-24 (at 13 percent) (see Figure B.5).[3]

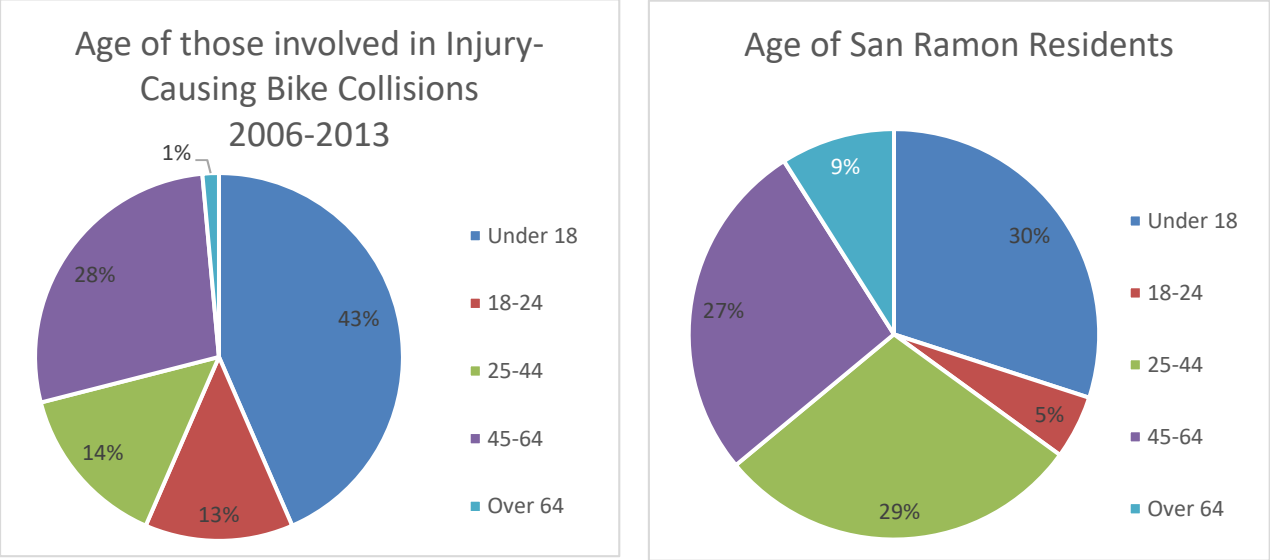


Figure B.5. Demographic Breakdown of Those Involved in Bike Crashes

In addition to youth being overrepresented in injury-producing bike crashes, males were over three times as likely to be involved in a bike-related collision than females (for reference, San Ramon's population is 51 percent female and 49 percent male). This breakdown is not unexpected – while we do not have the specific gender breakdown of bicycle ridership in San Ramon, three times as many bike trips nationally are made by men versus women, 76 percent to 24 percent, respectively.[4]

Existing Bicycle Network

Through the BMP, the City of San Ramon seeks to create a bike network that can serve users of all skill levels, address the community's desires for a stronger bicycle network, and celebrate the successes of the current network. Figure 2.1 provides an overview of the existing bicycle network in San Ramon.

Bicycle Facilities

The existing bike network in San Ramon is comprised of the following facilities. Additional information can be found in Chapter 2: Existing Bicycle Network of the BMP.

Class I Shared-Use Paths

Class I shared-use paths in San Ramon include:

[3] The Transportation Injury Mapping system (TIMS) reports injuries in different age groupings than the Census reports demographics, thus the discrepancies in the age breakdowns for those under 24 years old.

[4] *U.S. Department of Transportation, 2010* - 2009 National Household Travel Survey

Table B.2. Shared use paths/Class I facilities in San Ramon (Data Source: GIS)

Shared use paths/Class I Facilities	Length (mi)
Iron Horse Trail	4.48
Cross Valley Trail	1.15
West Alamo Creek Trail	1.1
Monarch Loop Trail	0.6
Redhawk Trail	0.88
Alamo Creek Trail	0.89

During the community engagement process, the community was asked for their feedback about the existing bicycle network and what they would like to see in the future. The following themes emerged from community comments about the shared use paths:

- Concern about potential conflicts between bicyclists and pedestrians on the shared use path eastbound on Bollinger Canyon Road.
- Interest in reducing delay for bicyclists at large, signalized intersections, especially where the Iron Horse Trail intersects with roadways.
- Interest in bicycle detection at traffic signals.
- Desire for safer bicycle crossings at intersections.
- Opportunities for bike facilities in excess right-of-way in some locations.

Comments specifically about the Iron Horse Trail include:

- Desire for stronger connections between the Iron Horse Trail and destinations, such as City Center.
- Interest in increasing the width of the Trail to help improve comfort and safety of all Trail users, especially between Bollinger Canyon Road and Norris Canyon Road.
- Some concern about conflicts between children and adults riding at higher speeds on the Trail.
- Improvements needed for the long signal times and need for bicycle and pedestrian overpasses.

Providing strong connections to these trails, especially the Iron Horse Trail, is an integral part of building a safe cycling network.

Class II Bicycle Lanes

Class II bicycle lanes in San Ramon include:

Table B.3. Bike lanes/Class II facilities in San Ramon (Data Source: GIS and General Plan)

Bike Lanes/Class II Facilities	Length (mi)
Bollinger Canyon Rd	2.4
East Branch Parkway	1.2
Albion Road	1.3
Monarch Road	1.2
San Ramon Valley Boulevard	7.5
Crow Canyon Road	3.3
Fostoria Way	0.2
Deerwood Road	0.8
Norris Canyon Road	0.8
Bishop Drive	1.0
Pine Valley Rd	0.1
Stage Coach Road	0.4
Village Parkway	0.3
Westside Drive	2.1
Dougherty Road	2.2
Alcosta Boulevard	2.4
Japonica Way	0.5
Ivy Hill Way	0.7
Wedgewood Road	0.7
Briar Oaks Drive/Stoneleaf Road	Class II: 0.08 Class III: 0.5
Dougherty Road	3.1
Shoreline Drive	0.11
Main Branch/West Branch Pkwy	0.7
Ivy Leaf Springs Road	0.3
Sherwood Way	0.6

During the community engagement effort, community members shared their desire for:

- More bicycle facilities throughout the community.
- Filling in the gaps in the network.
- Safer bicycle crossings at intersections/continuing bike lanes through the intersections.
- Highlighting conflict zones between bicyclists and motorists to increase motorist awareness of bicyclists.
- Improved signal timing loops for bicyclists.
- Stronger connections to destinations, such as City Center, shopping areas, schools, and Iron Horse Trail.

Comments were also provided for specific roadways. For example, participants shared that Bollinger Canyon Road between Crow Canyon Road and Norris Canyon Road was uncomfortable street for bicycling. Also, some participants, especially more experienced riders, said that they use San Ramon Valley Boulevard as an alternative to the Iron Horse Trail; they appreciate the wide shoulders which feels safer than roads without wide shoulders. These comments highlight opportunities for improved facilities on both Bollinger Canyon Road and San Ramon Valley Boulevard.

Class III Bike Routes

Bike routes/Class III facilities in San Ramon include:

Table B.4. Bike routes/Class III facilities in San Ramon (Data Source: GIS)

Bike Routes/Class III Facilities	Length (mi)
Broadmoor Drive	2.1
Norris Canyon Road	0.7
Bollinger Canyon Road	2.45
Davona Drive	0.8
Deerwood Drive	0.5
El Capitan Drive	0.7
Sunset Drive	0.2
Montevideo Drive	1.3
Alcosta Boulevard	2.0
Pine Valley Road	0.5
Kimball Avenue	0.3
Harcourt Drive	0.19

Throughout the community engagement process, community members shared that many bicycle routes do not feel safe to ride on. Roadways such as Alcosta Boulevard, Bollinger Canyon Road, Camino Ramon, Norris Canyon Road, and Sunset Drive were specifically identified as streets that people would like to ride on, but currently feel unsafe.

Bicycle Parking

Per Section D3-38.A. of the City of San Ramon Zoning Ordinance, multi-family, retail commercial, and office uses must provide at least one bicycle space per 10 motor vehicle spaces, with a minimum of two bicycle spaces. The bicycle spaces shall be conveniently located and include a stationary parking device.

Wayfinding and Signage

Some bicycle signage has been installed throughout San Ramon, such as bike route signage and wayfinding signs along the Iron Horse Trail. Some Iron Horse Trail signage has been obscured by vegetation and are not easily visible (see Figure B.6). Currently, there is not a comprehensive wayfinding program; however, City plans, such as the North Camino Ramon Specific Plan, identify this as a need.

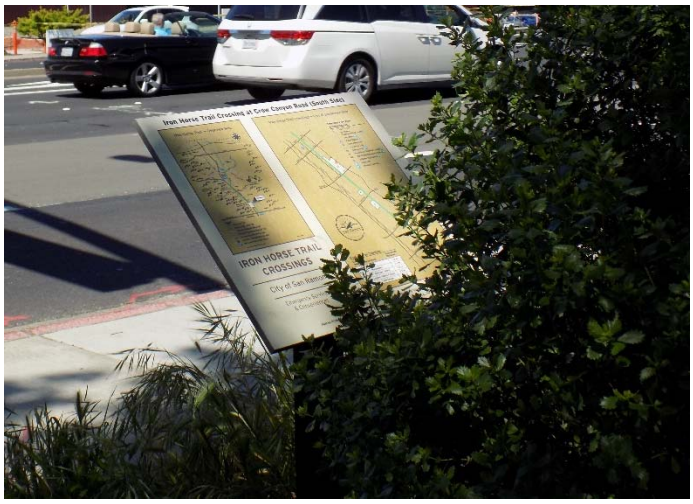


Figure B.6. Wayfinding signage on the Iron Horse Trail.

Past and Current Expenditures

The current Capital Improvement Plan (CIP) for San Ramon list projects and their associated funding for the next five years (2017-2022). The CIP includes seven projects that have bicycle components. These projects are listed below in Table B.5.

Table B.5. Bicycle Projects in San Ramon's Capital Improvement Plan for 2017-2022

CIP Project #	Project Name	Prior Year Expenditures	2017-18	2018-19	2019-20	2020-21	2021-22	Total 5 yr	Beyond 5yr	Total Project
5597	Bike Master Plan	$105,000	0	0	0	0	0	0	0	$105,000
5530	Bollinger Canyon Rd/Iron Horse Trail Bicycle Pedestrian Overcrossing	$2,519,650	0	0	0	0	0	0	$13,000,000	$15,519,650
5322	Bollinger Canyon Rd/Sunset Dr. Intersection Improvements	$951,631	0	0	0	0	0	0	0	$951,631
5531	Crow Canyon Rd/Iron Horse Trail Bicycle Pedestrian Crossing	$100,350	0	0	0	0	0	0	$12,000,000	$12,100,350
5328	Crow Canyon Rd Widening 4-6 Lanes (Alcosta to West Branch)	$1,819,280	0	$1,794280	$5,132,840	$75,000	0	$7,002,120	$3,175,000	$11,996,400
5327	Crow Canyon Rd Widening 4-6 Lanes (West Branch to Dougherty)	0	0	0	0	$324,135	0	$324,135	$6,272,125	$6,596,260
5413	Pedestrian Enhancement Devices	$865,009	$140,000	$240,000	0	0	0	$380,000	0	$1,245,009

Appendix C. Plans and Policies Review

San Ramon has a number of adopted plans and policies that may influence bicycle projects, investments, and priorities. This Appendix summarizes these plans and policies with an emphasis on any proposed projects or design guidance that may be applicable to the San Ramon Bicycle Master Plan.

The following table summarizes the documents reviewed and the adoption date.

Plan	*Date Adopted*
Local Plans	
San Ramon General Plan 2035	2015
San Ramon Municipal Code	2016
San Ramon City Center Plan/Bishop Ranch Development	TBD
City of San Ramon Parks and Community Services Master Plan Update & Strategic Action Plan	2011
Final Selected Conceptual Bridge Design Report at Bollinger Canyon Rd and Crow Canyon Rd	2015
San Ramon Bicycle Corridor Concept Plan	2009
Regional Plans	
Plan Bay Area 2040	2017
Caltrans District 4 Bicycle Plan	In progress
East Bay Regional Park District Master Plan	2013
Contra Costa Countywide Bicycle and Pedestrian Plan	2018
Contra Costa Measure J Expenditure Plan	2004
State Plans and Policies	
Toward an Active California: State Bicycle and Pedestrian Plan	2017
California Strategic Management Plan	2015
Caltrans Complete Streets Policy & Implementation Plan 2.0	2014-2017
Smart Mobility 2010	2010
California Transportation Plan 2025	2006
Assembly Bills	Varies
Senate Bills	Varies
Federal Policies	
US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations	2010
FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts	2016

Local Plans

San Ramon General Plan 2035

San Ramon's General Plan 2030 was adopted in 2015 and includes a discussion of bicycle planning in Section 5, Traffic and Circulation. This chapter intends "to provide guidance and specific actions to ensure the continued safe and efficient operation of San Ramon's circulation system." In addition, the General Plan looks to follow the lead on AB 1358, the California Complete Streets Act, in encouraging a balanced and multimodal transportation system that meets the needs of all users, and specifies the following five strategies to achieve this outcome:

1. Transportation programs are based on traffic circulation system needs and land use planning.
2. The City's traffic circulation planning efforts are integrated with those of adjoining cities and counties in a cooperative, regional planning effort.
3. State of the art traffic engineering techniques and principles are used to bring planned improvements to reality.
4. Transportation demand management (TDM) strategies are employed to reduce dependence on single-occupant vehicles for commute travel.
5. All transportation modes are considered in all phases of design and construction within the City to create a circulation network that is safe, efficient, and convenient for all user groups.

The last two strategies are especially important for supporting the Bicycle Master Plan and investing resources in bicycle infrastructure.

Policy Guidance

Within the Plan, there are a variety of policies that guide how the City should support bicycle planning and projects. The policies most applicable to the Bicycle Master Plan are shown below:

Complete Streets

"Complete Streets" aim to be inclusive of all users, including bicyclists. The Complete Streets model also supports the reduction of automobile use, which further increases comfort for people on bikes:

- 5.3-G-1 Encourage transportation facilities that consider the users' safety and allow for all modes of travel based on local conditions and needs of the community.
- 5.3-I-1 Develop Complete Streets Guidelines that establish local review and assessment criteria and encourage development of a multimodal transportation network to meet community needs.
- 5.3-I-2 Implement Complete Streets principles, as appropriate, for new roadway design and significant roadway rehabilitation.
- 5.3-I-3 Coordinate the implementation of Complete Streets concepts, as appropriate, with ongoing transportation and congestion relief programs such as the TDM Program, Street Smarts Traffic Safety Program, Residential Traffic Calming Program, Safe Routes to School Program and TRAFFIX Program.
- 5.3-I-4 Encourage Complete Streets concepts as a vehicle-miles-traveled and greenhouse gas reduction strategy.

Arterial Roadways and Local Collectors

While the Arterial Roadways and Local Collectors sections are mostly focused on providing mobility for automobiles, there is language that indirectly supports bike investments by referencing Complete Streets and encouraging freight to use appropriate routes:

- 5.4-I-7 Minimize congestion on arterials by fully implementing the policies in the Complete Streets, Transportation Demand Management and Public Transit sections of the Circulation Element.
- 5.4-I-8 Encourage regional freight movement on freeways and other appropriate routes; evaluate and implement vehicle weight limits as appropriate on arterial, collector and local roadways to mitigate truck traffic impacts in the community.
- 5.5-G-1 Design collector and local roadways to improve circulation and to connect residential and commercial areas of the City while incorporating Complete Streets concepts pursuant to Policy 5.3-I-2 where appropriate.

Transportation Demand Management
The Transportation Demand Management (TDM) Section of the General Plan is heavily focused on the reduction of single-occupancy vehicle trips, mostly through improving access to transit. That said, there are a few policies which specifically mention bicycling:

- 5.6-I-7 Encourage new development to include a mix of uses and Complete Streets concepts that will allow people to walk and bike between destinations and reduce the amount of automobile vehicle-miles-traveled.
- 5.6-G-2 Encourage trip reduction measures in an effort to reduce vehicle-miles-traveled, improve air quality, and reduce greenhouse gas emissions.
- 5.6-I-14 Consider the construction of public parking facilities in the City Center, North Camino Ramon Specific Plan, or other commercial areas to serve projected parking demand, while carefully balancing the need for adequate parking against the desire to minimize traffic growth and create a pedestrian/bicycle friendly environment using Complete Streets design concepts.

Bicycle and Pedestrian Routes
The most detailed guidance on bike planning is in section 5.7 of the Plan: Bicycle and Pedestrian Routes. This section defines bike classifications for the City, as follows:

- **Class I bikeway,** also referred to as a bike path, is a paved, separate right-of-way that is physically separated from any street.
- **Class II bikeway,** or bike lane, is a one-way, striped, and signed lane on a street.
- **Class III bike routes** share the road with vehicle traffic or pedestrians and are marked only by signs.

Since the adoption of the General Plan, Caltrans has created a “Class IV” designation for separated bike lanes. This update should be addressed in the Bicycle Master Plan.

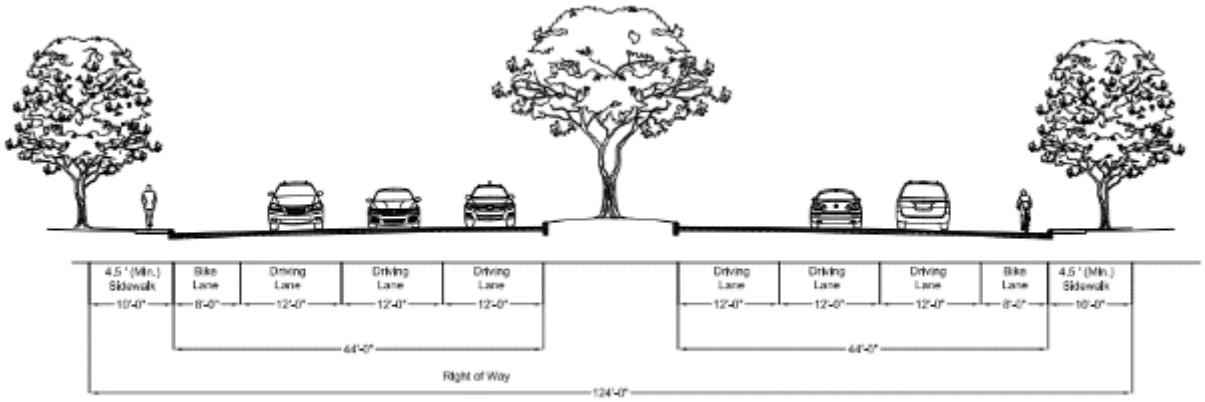
The General Plan also has a spectrum of policies supportive of bicycling:

- 5.7-G-1 Encourage bicycling and walking as alternatives to driving, consistent with Complete Streets concepts.
- 5.7-I-1 Establish a network of on- and off-street bicycle routes to encourage their use for commute, recreational, and other trips. Improve and expand bicycle routes for commuters in San Ramon.
- 5.7-I-2 Develop bicycle routes that provide access to regional employment centers, shopping centers, public facilities, transit centers, schools, and parks.
- 5.7-I-3 Continue to emphasize the Iron Horse Trail as a major north-south route for non-motorized transportation by improving connectivity and enhancing amenities for bicycles and pedestrians.

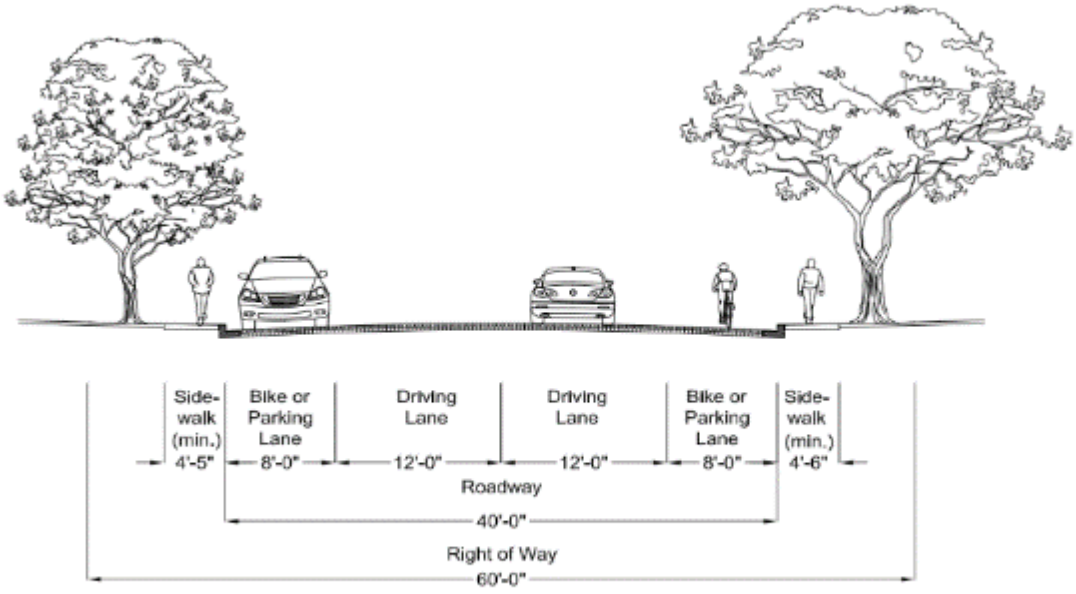
- 5.7-I-4 Encourage future development along the trail corridor to provide connection points and amenities as appropriate. Amenities may include, but are not limited to, benches, landscaping, and signage.
- 5.7-I-5 Require bicycle parking, storage and other support facilities as part of any new office and retail developments and public facilities. Facilities may include, but are not limited to, racks, lockers, and changing facilities.
- 5.7-I-6 Continue to promote and implement through the development review process, continuous circulation facilities within Bishop Ranch Business Park, commercial districts, and residential neighborhoods to enhance connectivity and promote pedestrian and bicycle modes of transportation consistent with Complete Streets concepts.
- 5.7-I-7 Continue to implement accessibility standards for physically disabled persons within the public rights-of-way.
- 5.7-I-8 Adopt a local or regional Bicycle Master Plan that considers sources of statewide funding for bicycle programming. The Contra Costa Countywide Bicycle and Pedestrian Plan can be adopted locally and includes San Ramon bicycle and pedestrian resources. The City can rely on that Plan to pursue grant funding for bicycle, pedestrian, and transportation improvements.
- 5.7-I-9 Implement the San Ramon Valley Iron Horse Trail Corridor Concept Plan by refining the design alternatives and pursue funding through grants, public/private partnerships and other funding sources as appropriate. The Concept Plan contemplates improvements such as grade separations at Bollinger Canyon Road and Crow Canyon Road.
- 5.7-I-10 Require roadway improvement projects to minimize both temporary and permanent reductions in bicycle and pedestrian mobility and/or accessibility.
- 5.7-I-11 Work with neighboring jurisdictions to ensure that continuity in bicycle and pedestrian networks is provided at jurisdictional boundaries. This policy is intended to prevent the creation of gaps in bicycle and pedestrian networks that would be inconsistent with the Complete Streets concept.
- 5.7-I-12 Work with Caltrans and other appropriate agencies to improve bicycle and pedestrian mobility at freeway crossings.
- 5.7-I-13 Promote educational efforts about traffic laws and safe practices for all modes of transportation. This policy is intended to increase awareness of the California Vehicle Code requirements (e.g., yielding to pedestrians at crosswalks), potentially preventing conflicts between motorists, bicyclists, and pedestrians.

Design Guidance

The General Plan offers a few general schematics on how bicycle infrastructure should be designed for roadways. All of the cross sections have a note that the represent a typical layout and may be modified by the City Engineer, as needed.



Major Arterial (not to scale)



Local Collector (not to scale)

Figure C.1. San Ramon General Plan Street Design Schematics (Source: City of San Ramon General Plan 2035, Adopted 2015)

Proposed Projects

Along with the bicycle trail classifications, the General Plan proposes a small number of new bike trails, which are included in the San Ramon Valley Iron Horse Trail Bicycle Pedestrian Corridor Concept Plan (summarized later in this document). These projects identify overcrossings that will provide more accessible alternatives to crossings at major streets. These projects are shown on the following map and include crossings at Bollinger Canyon, Sycamore Valley, and Crow Canyon Roads.

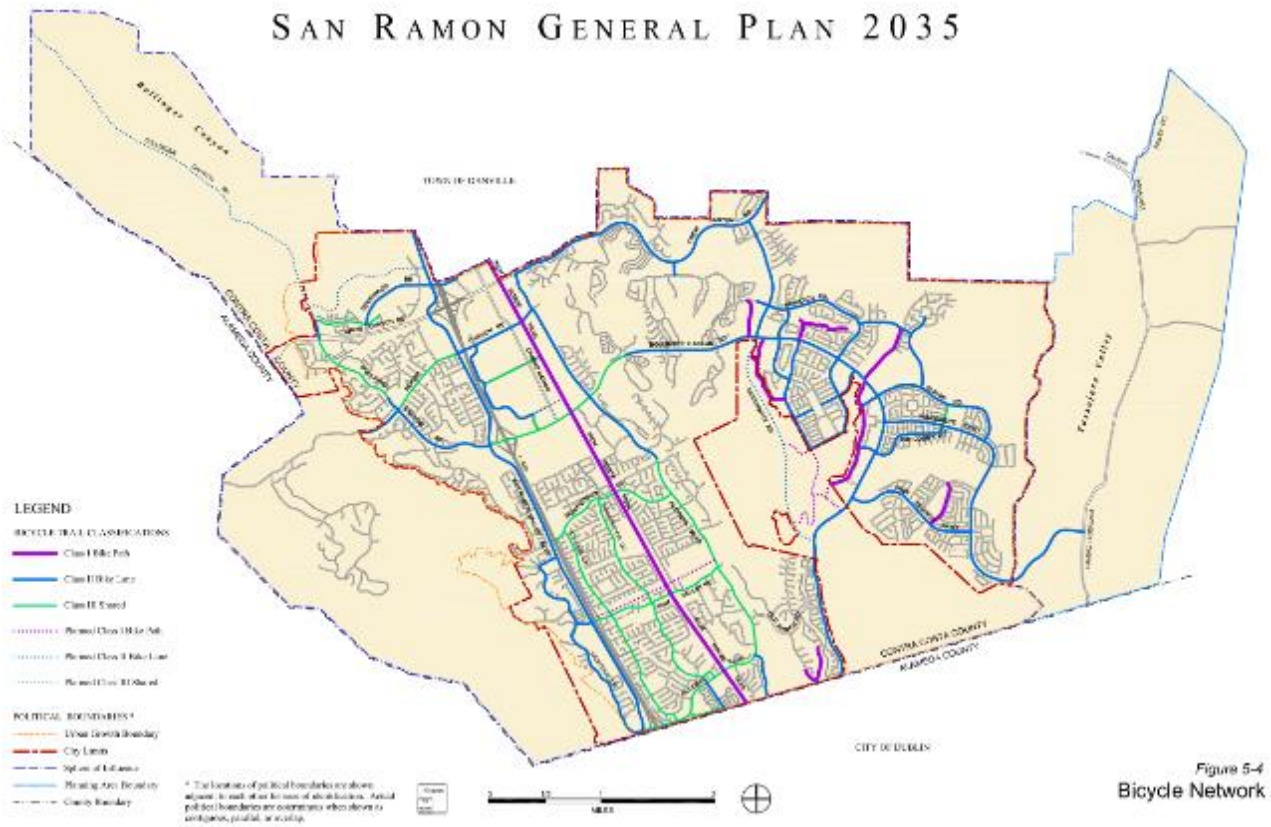


Figure C.2. City of San Ramon Bicycle Network (Source: San Ramon General Plan 2035, Adopted 2015)

San Ramon Municipal Code

The San Ramon Municipal Code[1] consists of all ordinances adopted by the city council which are of a general and permanent nature, and is the totality of the ordinances adopted by City Council. The codes most applicable to bicycle planning are found in Division C4 – Land Development. Within this Division, there are three notable sections to consider for the Plan:

1. **Levels of Traffic Service.** The Code states that the minimum acceptable LOS at an arterial intersection shall not be greater than Level D (V/C ratio not greater than 0.90. Because this ratio is calculated purely with automobile capacity, bicycle traffic and the potential for an intersection (or roadway) that may be failing to be a catalyst for bicycle use is not considered.

[1] The entire Code can be found at https://www.municode.com/library/ca/san_ramon/codes/code_of_ordinances?nodeId=TITCCODELAUS

Related to level of service (LOS), in 2013, California Governor Jerry Brown signed SB 743 into law that would eliminate auto delay, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts in many parts of California (if not statewide). According to the legislative intent contained in SB 743, these changes to current practice were necessary to more appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

2. **Transportation Mitigation, and Road Improvement and Transportation Fees.** These fees from developments within the City of San Ramon generate funds to finance improvements citywide, and in specific Southern Contra Costa fee areas, respectively, listed in the "development program report." The fee structure relates to the types of development projects and the increased automobile traffic the development is anticipated to cause.

   The development program report generally consists of projects that focus on highway interchanges, and HOV lanes, but do include road improvements for Crow Canyon Road and Safety Improvements for Vasco Rd. There is also notation for an Express Bus/Bus Rapid Transit Project. In the brief descriptions of these projects (A-9, A-10, and A-11), [2] there is no mention of bicycle improvements, although there may be potential given the breadth of these projects.

3. **Street Standards.** The General Code details the dedication, roadway width, sidewalk area, and curb/gutter area needed for each type of roadway (Principal thoroughfares – Type A and B, general thoroughfares, and general arterials). This description does not call out bicycle lanes or paths, but does reference the City's General Plan as a resource for the City Engineer in designing roads.

San Ramon City Center Plan/Bishop Ranch Development

The San Ramon City Center Project is a redevelopment of four parcels in the central area of San Ramon, the quadrants of the intersection of Bollinger Canyon Rd. and Camino Ramon. The following table summarizes their current state (Parcel 2 is currently under construction).

[2] The full list of projects can be found at http://64.166.146.245/docs/2015/BOS/20150512_586/21692_Exhibit%201.pdf

Table C.1. Bishop Ranch Parcel Summary (Source: Bishop Ranch Master Plan, 2007)

Parcel No.	Acreage	Existing Uses	Parcel Boundaries
1A	14.27	Undeveloped land; surface parking area for Bishop Ranch 1	Bishop Ranch 1 entrance road (west), Bollinger Canyon Road (north); Bishop Ranch 1 East roadway (east and south)
1B	3.52	Surface parking area for Bishop Ranch 1	Chevron Park (west), Bollinger Canyon Road (north); Bishop Ranch 1 entrance road; Bishop Ranch 1 structure (south)
2	14.57	Bishop Ranch 2	Sunset Drive (west); Bishop Drive (north); Camino Ramon (east); Bollinger Canyon Road (south)
3A	11.29	Undeveloped land	Camino Ramon (west); Bishop Ranch 3 parking structure (north); Iron Horse Trail (east); Bollinger Canyon Road (south)
	43.65		

The redevelopment will change the current uses of parking lots, undeveloped land, and office park to a mixed-use space including retail, a hotel, apartments, active public space, a transit center and parking. The area has been under discussion for development for the last two decades, with the vision and purposes of the area changing as the economy waivered, anchor tenant feasibility was reassessed, and the needs and wants of San Ramon changed.

Figure C.3. Bishop Ranch Project Boundary

The piazza portion of this project is envisioned to be the activator of the space, allowing transparency between the indoors and outdoors and creating interactions between users. The most recent plans, created in 2014 by the Renzo Piano Building Workshop emphasize the pedestrian realm within the development, but characterize vehicles as the “DNA” of San Ramon as a suburban city and the dominant way that residents and visitors will be getting to and from the City Center. That said, the plan does look to use design to make the cars “disappear” into the Center to maintain the piazza and pedestrian feel.

Proposed Projects

The Bishop Ranch Development project will expand the existing bicycle network to increase bicycle connections. The site is located between Class II bike facilities (bike lanes) on Bishop Dr., San Ramon Valley Blvd, and Alcosta Blvd. The project improvements will include continuing the bike lanes along Bishop Dr. from their current terminus at Sunset Drive to the Iron Horse Trail (a longer connection than was originally proposed in 2007), along with signal upgrades.

The project will also provide bicycle parking as required by the City's Zoning Ordinance. A total of 691 bicycle spaces will be required, and located throughout the project.

City of San Ramon Parks and Community Services Master Plan Update & Strategic Action Plan (2011)

The Community Services Master Plan Update and Strategic Action Plan (adopted 2008, updated in 2011) looked to review the Parks Department's progress on past goals and develop new strategies for the future. The Iron Horse Trail is a large part of achieving the department's visions of providing recreation experiences that promote health and wellness, creating safe and secure environments for recreation, and supporting economic development.

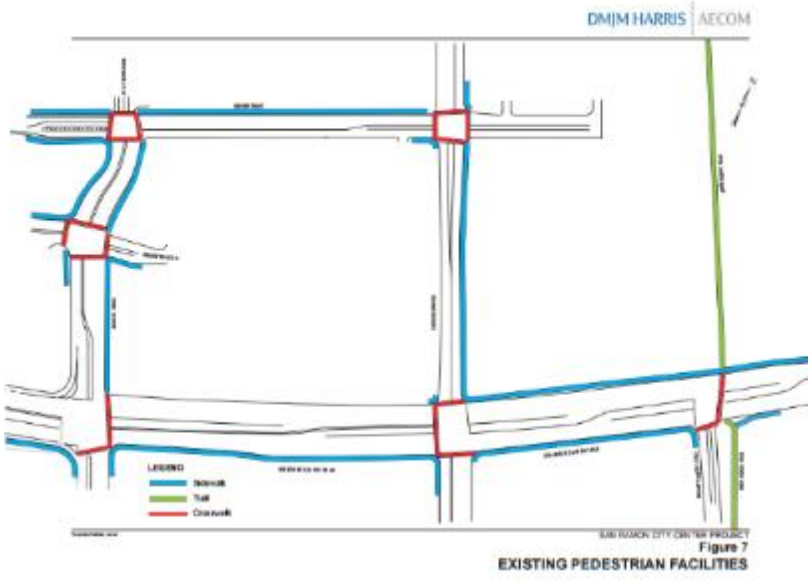


Figure C.5. Existing Pedestrian Facilities (Source: City of San Ramon Parks and Community Services Master Plan Update & Strategic Action Plan, Adopted 2011)

The Plan updated 2010's strategic goals, with a heavy emphasis on trails and their role in connecting the community, including:

- **Strategic Goal #1.** Provide the community with an integrated park and trail system that connects people with community centers, parks, open space, schools, and programs and utilizes the park system to connect to all parts of the San Ramon community
- **Strategic Goal #2.** Sustain the park and trail system through the upgrade and renovation of older parks and provide consistent service-level standards and maintenance frequencies in all parks, trails, and facilities based on park type, level of use/activity and seasonal/special needs.

In addition, the Plan summarizes the following planned bicycle trails from other City Plans:

- Iron Horse Trail (General Plan, Traffic and Circulation Chapter)

- Cross Valley Trail from Westside Drive to Dougherty Rd (General Plan, Traffic and Circulation Chapter)
- A route generally paralleling Old Ranch Rd from Alcosta Blvd to Dougherty Rd (General Plan, Traffic and Circulation Chapter)
- Trails along creek corridors, open hillsides, and ridgelines (General Plan, Open Space Chapter)
- Calaveras Ridge Trail from Las Trampas Regional Part to Pleasanton Ridge Regional Park (1997 San Ramon Parks and Community Services Master Plan)

Proposed Projects

Appendix 7.1 Includes a parks and facilities map that shows current and proposed trails in relations to existing, future, and regional parks.

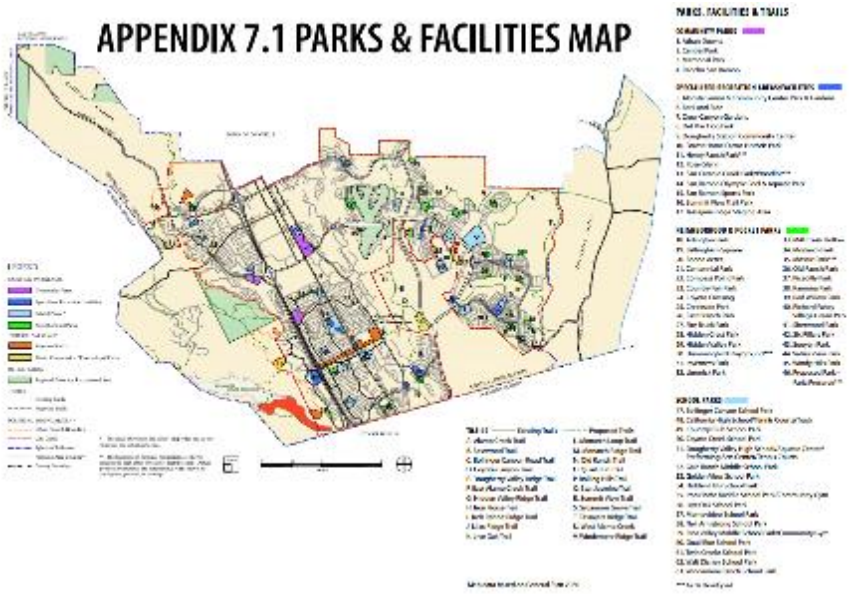


Figure C.6. Current and Planned Parks and Facilities (Source: City of San Ramon Parks and Community Services Master Plan Update & Strategic Action Plan, Adopted 2011)

Final Selected Conceptual Bridge Design Report at Bollinger Canyon Road and Crow Canyon Road (2015)

This Bridge Design Report effort, with funding from the Transportation Planning Land Use (T-PLUS) and Measure J funds, led to the Conceptual Bridge Design effort to select bridge types and locations. The proposed overcrossings aim to:

1. Improve safety by eliminating conflicts between pedestrians, bicyclists and motorists;
2. Improve motor vehicle circulation by removing the at-grade crossings;
3. Reduce and eliminate unsafe crossing maneuvers by pedestrians and bicyclists;
4. Enhance safety by providing an environment that encourages walking and bicycling along the Iron Horse Regional Trail; and
5. Increase trail usage by improving the connectivity at the Bollinger Canyon Road and Crow Canyon Road crossings.

Design Requirements and Decisions

Future development of the bridge alignments and profile grades will consider the following design references:

- Caltrans Pedestrian Accessibility Guideline for Highway Projects; Design Information Bulletin (DIB) 82-05;
- Caltrans Design Checklist (vertical curves, design speeds, etc.) (DIB) 78-03
- Caltrans Highway Design Manual (HDM);
- AASHTO Guide for the Development of Bicycle Facilities (4th Edition); and
- According to the HDM, the target design speed for a Class I overcrossing is 20mph.

After an extensive public outreach process, the City Council approved a Cable- Stayed Single Mast Main Tower on south side of Bollinger Canyon Road and Cable Stayed A -frame with tower on south side of Bollinger Canyon Road. Additional details and illustrations can be seen in the full report. As of 2017, the City is actively applying for funding to move forward with final design and construction.

Bicycle Corridor Concept Plan (2009)

San Ramon's Bicycle Corridor Concept Plan, completed in 2009, evaluated the potential for bicycle and pedestrian overcrossings to help improve access and safety along the Iron Horse Trail. The Iron Horse Trail is a popular regional bike/pedestrian trail that runs from Concord in the north to Dublin to the south. Although the trail goes through San Ramon, it has a "back of house" feel because major land uses back up to it instead of fronting it. Most of the trail feels "pastoral," although a piece at Bollinger Road in San Ramon will become more urban with the upcoming development of the San Ramon City Center. The Trail currently crosses Crow Canyon Road (a corridor lined with automobile-oriented retail establishments) at a signalized intersection.

Regional Plans

Plan Bay Area 2040 (2017)

Plan Bay Area 2040 in a long-range regional transportation plan and "Sustainable Communities Strategy" for the nine counties in the San Francisco Bay Area, including Alameda County. The plan sets out goals, a proposed growth pattern, a transportation investment strategy, and actions as an update to the previous plan, which was adopted in 2013. Transportation actions were driven by the current congestion issues within the region and, as such, identified a target of "Increasing non-auto mode share." While most of the detailed actions focused on transit improvements, continuing investments in bicycle infrastructure and Safe Routes to School efforts were noted.

Caltrans District 4 Bicycle Plan (in progress)

The District 4 Bicycle Plan is a strategic planning document that identifies and prioritized bicycle investments on State-owner transportation infrastructure. It is part of the statewide "Toward an Active California" effort, which seeks to improve multimodal access, improve health outcomes, and reduce traffic congestion, among other goals. The effort is currently underway to gather the needs and priorities of Bay Area residents. The final plan is anticipated in Winter 2018.

East Bay Regional Park District Master Plan (2013)

The East Bay Regional Park District Master Plan guides the management and programming of the East Bay Regional Park District, which serves all of Alameda and Contra Costa counties, a 1,400 square mile

area that has 2.6 million residents. The Plan outlines the goals and strategies of the Park District, as well as opportunities for the public to participate in the future growth of recreation in the region.

Trails are an essential part of the Park District's portfolio, as shown in its mission statement:

> The East Bay Regional Park District preserves a rich heritage of natural and cultural resources and provides open space, parks, trails, safe and healthful recreation and environmental education. An environmental ethic guides the District in all of its activities.

The District operates over 1,200 trail miles that serve hikers, bikers, and equestrians. The plan states that the demand for the trails is growing, especially in the interest of recreational bikers and bike commuters. Specifically, the plan includes the following action items on trails:

- The District will provide a diverse system of non-motorized trails to accommodate a variety of recreational users including hikers, joggers, people with dogs, bicyclists, and equestrians. Both wide and narrow trails will be designed and designated to accommodate either single or multiple users based on location, recreational intensity, environmental and safety considerations. The District will focus on appropriate trail planning and design, signage, and trail user education to promote safety and minimize conflict between users.
- The District will continue to add narrow trails designated as both single- and multi-use for hikers, equestrians, people with dogs, and bike riders throughout the system of regional parklands.
- The District will expand will expand its unpaved multi-use trail system as additional acreage and new parks are added. The District will continue to provide multi-use trails to link parks and to provide access to park visitor destinations.

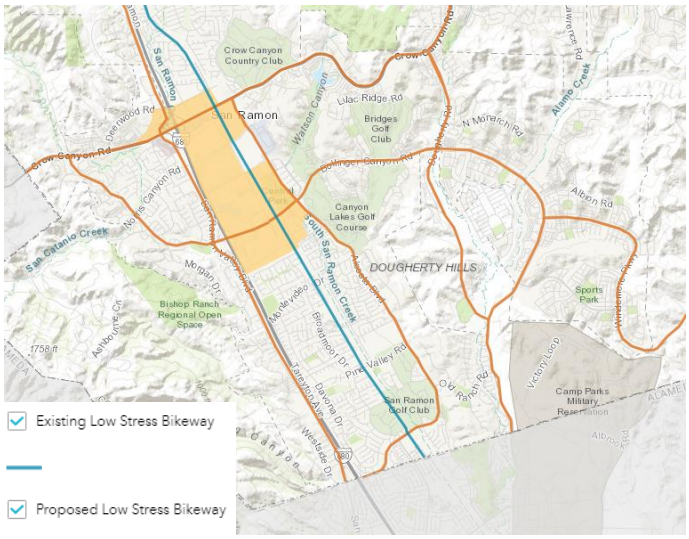
The complete plan can be found at http://www.ebparks.org/Page50.aspx.

Contra Costa Countywide Bicycle and Pedestrian Plan (2018)

The Contra Costa Countywide Bicycle and Pedestrian Plan was updated in 2018 to harmonize local plans for bicycle and pedestrian networks in the county and to better understand where and how often people walk and bicycle in the county. Updates since the 2009 Plan include new approaches to public outreach (i.e., "pop-up" events throughout the county), focusing on the "interested but concerned" majority of potential bicyclists, integrating level of traffic stress into the analysis of existing roadways, supporting new standards and best practices in pedestrian and bicycle facility design and planning, and encouraging local agencies to adopt complete streets plans.

The goals of the plan are as follows:

- Encourage more people to walk and bicycle
- Increase safety and security for pedestrians and bicyclists
- Create a safe, connected, and comfortable network of bikeways and walkways for all ages and abilities



Costa Countywide Bicycle Network in San Ramon (Source: Contra Costa Countywide Bicycle and Pedestrian Plan, 2018)

- Increase the livability and attractiveness of Contra Costa's communities and districts
- Equitably serve all of Contra Costa's communities while ensuring that public investments are focused on projects with the greatest benefits

The plan defines the "Countywide Backbone Network" (CBN), a connected, low-stress (LTS 1 or 2) set of facilities that serves all ages and abilities and addresses the barriers created by high-stress arterials and collectors. The CBN is envisioned as a 662-mile bikeway network, of which only approximately 150 miles are currently developed as low-stress facilities. The proposed backbone would be comprised of a variety of facility types, including: multi-use trails, buffered bike lanes, bike boulevards, separated bikeways, and low-stress cross-barrier connections.

Design Guidance

The Plan does not provide any specific design guidance, but refers the jurisdictions to a suite of resources:

- NACTO Urban Bikeway Design Guide
  https://nacto.org/publication/urban-bikeway-design-guide/
- NACTO Urban Streets Design Guide
  https://nacto.org/publication/urban-street-design-guide/
- NACTO Transit Street Design Guide
  https://nacto.org/publication/transit-street-design-guide/
- FHWA Small and Rural Multi-Modal Networks Guide
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf
- AASHTO Guide for the Development of Bicycle Facilities
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- U.S. Access Board Draft Guidelines for Accessible Public Rights-of-Way (PROWAG)
- Chapter 1000 of the Caltrans Highway Design Manual
  www.dot.ca.gov/hq/oppd/hdm/pdf/chp1000.pdf
- Caltrans Class IV Bikeway Guidance
- FHWA Separated Bicycle Lane Planning and Design Guide
  https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm
- MassDOT Separated Bike Lane Planning and Design Guide
  https://www.mass.gov/lists/separated-bike-lane-planning-design-guide
- CROW Design Manual for Bicycle Traffic 2017
- ITE Recommended Practices on Accommodating Pedestrians and Bicyclists at Interchanges
- NACTO Curb Appeal: Curbside Management Strategies for Improving Transit Reliability
  https://nacto.org/tsdg/curb-appeal-whitepaper/
- NACTO Blueprint for Autonomous Urbanism
  https://nacto.org/publication/bau/blueprint-for-autonomous-urbanism/

The document also covers a list of programs to promote bicycling, such as bike parking, showers and changing rooms, promotion, Safe Routes to School, and law enforcement.

Proposed Projects

The Countywide Bicycle and Pedestrian Plan includes a map showing several proposed Class I and II bike corridors in San Ramon. At the time of this writing (April 2018), Appendix F: Local Bicycle and Pedestrian

Projects was not yet complete. This section will supply a detailed list of recommended pedestrian and bicycle projects in San Ramon and identify funding sources.

Contra Costa Measure J Expenditure Plan (2004)

Measure J was approved by a 71% vote in 2004 and continues the county's half-cent transportation sales tax through 2034. The anticipated $1.55 billion in revenues will fund the voter-approved "Expenditure Plan" of transportation programs and projects.

Measure J requires local jurisdictions to align with the county's Growth Management Program (GMP) in order to received funding from two of the measure's programs. Jurisdictions must "incorporate policies and standards into its development approval process that support transit, bicycle and pedestrian access in new developments." Chapter 8, "Other Tools for Local Agencies" provides guidance for jurisdictions looking to improve their bicycle and pedestrian infrastructure.

Proposed Projects and Programs

Of the 29 projects and programs that will be funded by Measure J, the following are bicycle related and available for San Ramon/East County (the associated funding was the initial prediction and has most likely decreased in recent years due to the 2008/2009 economic downturn):

- **Transportation for Livable Communities Project Grants ($100 million).** Five percent of sales tax revenues are to be used to implement specific transportation projects that encourage the use of alternatives to the single occupant vehicle such as: pedestrian, bicycle and streetscape facilities, traffic calming and transit access improvements. Allocations are subject to compliance with the GMP, as outlined in the CC-TLC Summary included as Part IV of this Expenditure Plan.
- **Pedestrian, Bicycle and Trail Facilities ($30 million).** One and a half percent of revenues are for construction of pedestrian and bicycle facilities including regional trails throughout Contra Costa.
- **Safe Transportation for Children ($90.9 million).** $40 of the $90.0 million is for a San Ramon Valley School Bus Program and school-related access, which will identify specific projects which may include the SchoolPool and Transit Incentive Programs, pedestrian and bicycle facilities, sidewalk construction and signage, and other projects and activities to provide transportation to schools.
- **Major Streets: Traffic Flow, Safety and Capacity (80.4 million).** This fund focuses on improvements to major thoroughfares such as traffic signals, widening, traffic calming and pedestrian safety improvements, shoulders, installation of bike facilities, sidewalks, bus turnouts, curbs and gutters. $18 is allocated for East County
- **Local Streets Maintenance & Improvements ($360 million).** These revenues are allocated to local jurisdictions on a formula basis for transportation projects to be determined locally, including street and road maintenance, subject to compliance with the Growth Management Program (GMP).

State Policies

Toward an Active California: State Bicycle and Pedestrian Plan (2017)

The California Statewide Bike and Pedestrian Plan is a visionary and comprehensive policy to support active modes of transportation. Policies that stem from this plan will guide decisions about future bicycle and pedestrian investments, and support local governments in creating a safe active transportation network.

The draft plan's vision states that "by 2040, people in California of all ages, abilities, and incomes can safely, conveniently, and comfortably walk and bicycle for their transportation needs." The plan identifies policies and strategies that will get Caltrans to this goal focusing on safety, mobility, preservation of the transportation system, and social equity.

California Strategic Management Plan (2015)

This plan provides strategic direction for Caltrans, including targets of doubling walking trips and tripling bicycling trips by 2020. Additionally, the plan calls for reducing user fatalities and injuries, promoting community health through active transportation, and improving the quality of life for all Californians by increasing accessibility to all modes of transportation.

Complete Streets Implementation Action Plan 2.0 (2014-2017)

The Caltrans Complete Streets Implementation Action Plan 2.0 Policy outlines the complete streets policy framework and describes Caltrans' complete street efforts. The Plan defines a Complete Street as:

> A transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility. Complete street concepts apply to all roadways in all contexts including local roads and state highways in rural, suburban, and urban areas.

Smart Mobility 2010

The California Smart Mobility Call to Action provides new approaches to implementation and lays the groundwork for an expanded State Transportation Planning Program. It enhances the scope of the existing California Transportation Plan by analyzing the benefits of multi-modal, interregional transportation projects. The Smart Mobility framework emphasizes travel choices and safety for all users, supporting the goals of social equity, climate change intervention, energy security, and a sustainable economy.

California Transportation Plan 2025 (2006)

The California Transportation Plan's Vision Statement calls for California to have a "safe, sustainable, world-class transportation system that provides for the mobility and accessibility of people, goods, services, and information through an integrated, multimodal network that is developed through collaboration and achieves a Prosperous Economy, a Quality Environment, and Social Equity." The first goal of the plan includes enhancing modal choice and connectivity.

Assembly Bills

Assembly Bill 32: Global Warming Solutions (2006)

The Global Warming Solutions Act (AB 32) has a goal of California reaching 1990 greenhouse gas emission levels by 2020 by reducing emissions, including those caused by motor vehicles.

Assembly Bill 1358: Complete Streets (2008)

All California Cities and Counties must include accommodations for all street users (pedestrians, bicyclists, transit riders, motorists, children, persons with disabilities, and elderly persons) in circulation element updates.

Assembly Bill 2245: Environmental quality: CEQA: Exemption: Bicycle Lanes (2015)

This bill exempts the restriping of roadways for bicycle lanes, provided the roadways are within an urban area and the restriping is consistent with a prepared bicycle transportation plan. A lead agency would be required to conduct a traffic assessment and safety impact, as well as conduct hearings, before determining if a project is exempt.

Assembly Bill 1193: Bikeways (2014)

Assembly Bill 1193 adds a fourth classification of bikeway to the Caltrans bikeway classifications. The new designation, Class IV bikeways, applies to cycle tracks or separated bike lanes.

Assembly Bill 1371: Vehicles: Bicycles: Passing Distance (2013)

AB 1371 requires that motor vehicles leave three feet of space between a bicycle and motor vehicle, when the driver of the motor vehicle is overtaking a bicyclist traveling in the same direction.

Senate Bills

Senate Bill 375: Sustainable Communities (2009)

SB 375 directs the Air Resources Board to set regional targets for the reduction of greenhouse gases. Metropolitan planning organizations must develop land use plans to meet these emission reduction goals by tying together regional housing needs and regional transportation planning to reduce greenhouse gas emissions from motor vehicle trips.

Senate Bill 743: Environmental Quality: Transit Oriented Infill Projects, Judicial Review Streamlining for Environmental Leadership Development Projects, and Entertainment and Sports Center in the City of Sacramento (2013)

SB 743 eliminates auto LOS and other measures of vehicle capacity or traffic congestion as a basis for determining significant impacts. The bill also removes parking impacts as a basis for impacts in select areas with nearby frequent transit service. This bill promotes infill development, active transportation, and reduction of greenhouse gas emissions.

Senate Bill 99: Active Transportation Program Act (2013)

The Active Transportation Program distributes federal funds for local and regional efforts to increase walking and bicycling. The funding is intended to increase the number of walking and bicycling trips, increase safety for those modes, and provide support for disadvantage communities to achieve transportation equity.

Federal Policies

US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

On March 15, 2010, the United States Department of Transportation announced a policy statement, included below, with a list of recommended actions.

“The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide

— including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes."

Recommended actions to support the policy statement include considering walking and biking equal to other modes, ensuring that there are transportation choices for people of all ages and abilities, going beyond minimum design standards, collecting data on walking and biking trips, and several other actions that make it easier for people to walk and bike.

FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts

This publication highlights ways that designers can apply design flexibility found in current national design guidance to reduce multimodal conflicts and achieve "connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities."

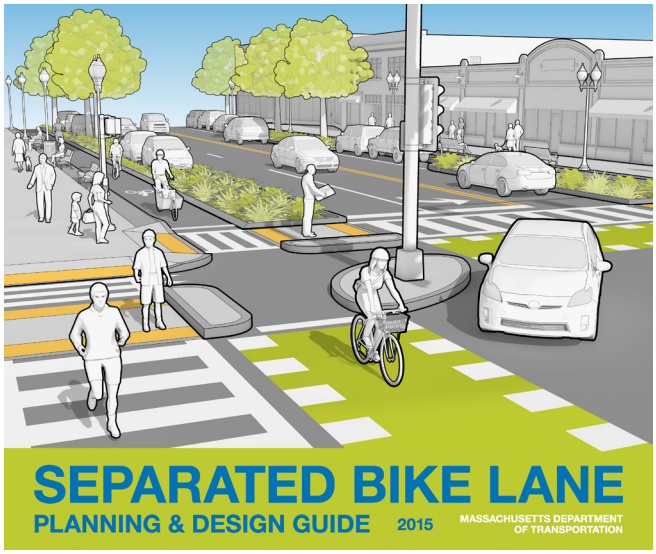
SAN RAMON BICYCLE MASTER PLAN
BICYCLE FACILITIES TOOLKIT

ToolDesignGroup

TABLE OF CONTENTS

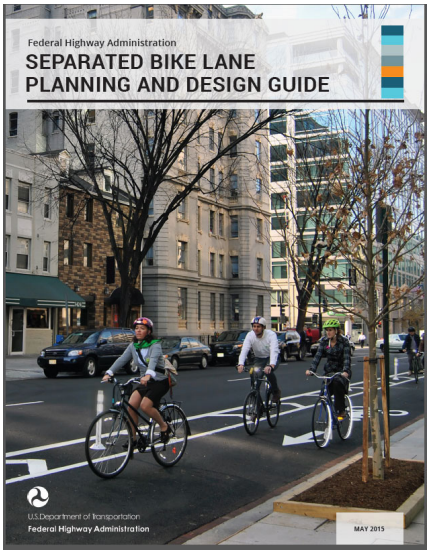
NATIONAL STANDARDS AND RESOURCES

The bicycle facilities and amenities included in this toolkit are based on the recommendations from the following state and national standards and resources: the California Highway Design Manual, California Manual on Uniform Traffic Control Devices, American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, FHWA Separated Bike Lane Planning and Design Guide, National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, and the MassDOT Separated Bike Lane Planning and Design Guide.



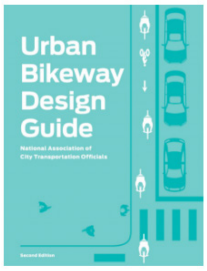
Massachusetts Department of Transportation (MassDOT)

Separated Bike Lane Planning & Design Guide, 2016



Federal Highway Administration (FHWA)

Separated Bike Lane Planning and Design Guide, 2015

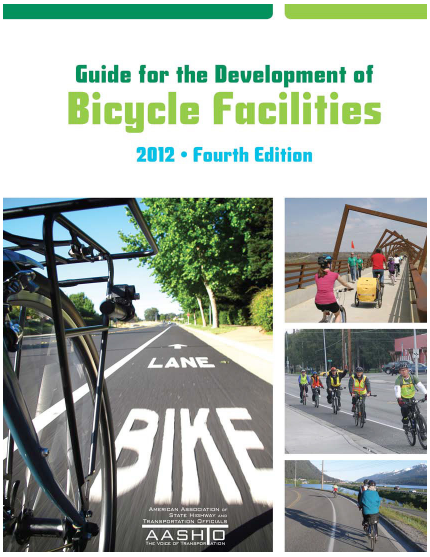


National Association of City Transportation Officials (NACTO)

Urban Street Design Guide, 2013

Transit Street Design Guide, 2017

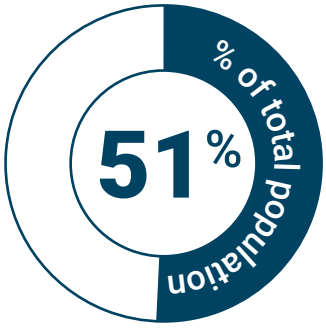
Urban Bikeway Design Guide, 2012



American Association of State Highway and Transportation Officials (AASHTO)

Guide for the Development of Bicycle Facilities, 2012

POTENTIAL BICYCLE USERS



Types of Cyclists

The figure below illustrates a typical range of cyclists. Estimates show the greatest percentage of the population—approximately 51%—fall into the "Interested but Concerned" category. The "Interested but Concerned" are most comfortable cycling separated from motorized vehicles. On the other end of the spectrum, roughly 7% of the population is "Strong and Fearless", comfortable sharing the road with motorized vehicles. In the middle, approximately 5% are "Enthusiastic and Confident", comfortable cycling for short distances with motorized vehicles. See pages 6-7, Bikeway Facilities Selection Chart, to determine which facility types best serve the different types of cyclists.

Interested but Concerned

Who are they?

A mother and daughter who enjoy Saturday rides to the San Ramon Public Library along the Iron Horse Trail that runs near their house. Concern over crossing a busy road prevents them from riding together to elementary school during the week.

Who are they?

A 45-year-old father of two who was just diagnosed with pre-diabetes. His doctor encouraged him to be more active, so he's been thinking about commuting to work by bike. As a motorist, he feels uncomfortable passing bicyclists, so he isn't sure he'd feel comfortable as a bicyclist sharing the road with cars.

Who are they?

A worker who just started a new job at Bishop Ranch. He's used BRiteBikes a few times to go out to lunch. He enjoys riding as long as he stays on quiet streets or the sidewalk. He'd like to be able to ride to more destinations,, but he's uncomfortable crossing busy roads and intersections along the way.

LOWER STRESS TOLERANCE

POTENTIAL BICYCLE USERS

Enthusiastic and Confident

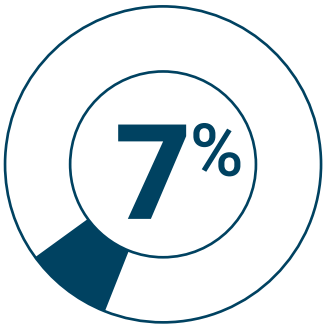
Who are they?

A woman who rides her bike downtown every morning to run errands. She prefers to ride on neighborhood streets, but doesn't mind riding the last few blocks on a busy street since there's a bike lane.

Who are they?

A lower-income resident who rides a bicycle to save money for other household expenses. He's comfortable riding on Norris Canyon Road because it has bike lanes.

Strong and Fearless



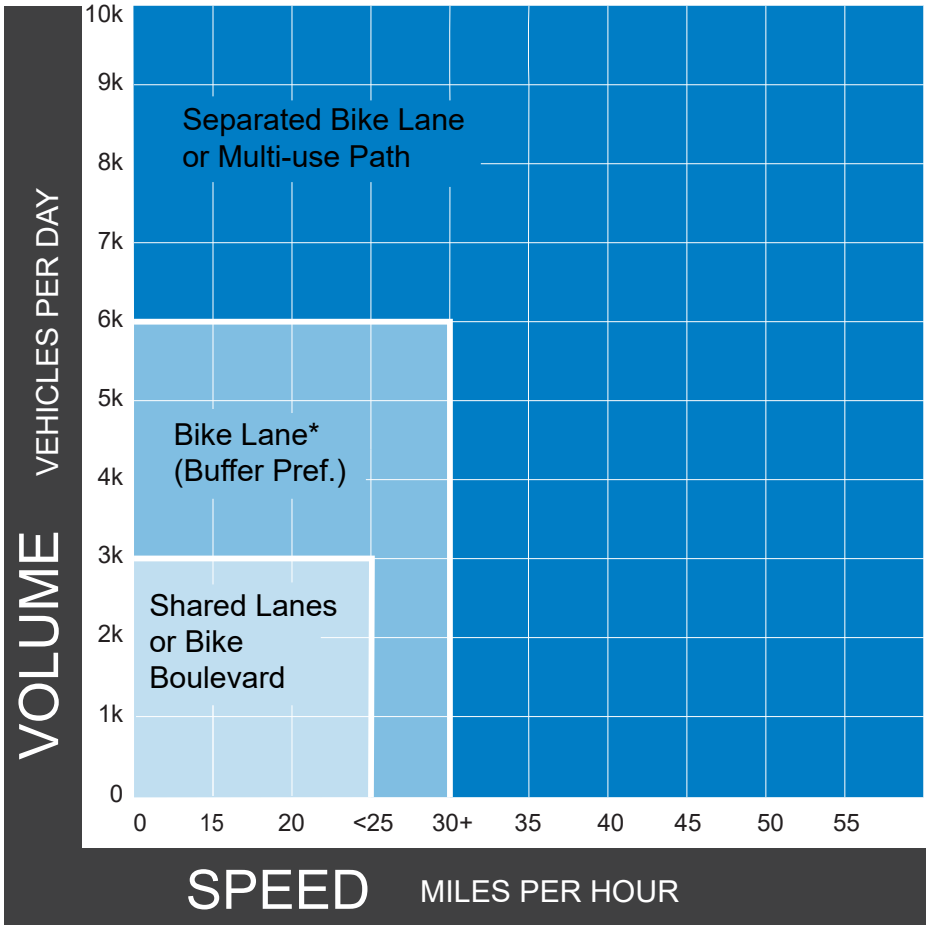
Who are they?

A recent Diablo Valley College grad who can't wait to hit the road this weekend for a 100-mile ride on his brand new road bike. He helped pay his way through college as a bike messenger, and loves the rush that he gets from racing.

BICYCLE FACILITY SELECTION

Designing for Interested but Concerned and Enthusiastic and Confident Bicyclists

"Interested but Concerned" bicyclists prefer physical separation as traffic volumes and speeds increase. The bikeway facility selection chart below identifies bikeway facilities that improve the operating environment for this bicyclist type at different roadway speeds and traffic volumes. The "enthusiastic and confident" bicyclist will also prefer bikeway treatments noted in this chart. If a community's goal is to increase bicycling, it is appropriate to select facility types based on this chart.



*advisory bike lanes may be an option where traffic volume < 3k ADT

* To determine whether to provide a shared-use path, separated bike lane, or buffered bike lane, consider pedestrian and bicycle volumes or, in the absence of volume, consider land use.

FACILITY DETAILS:

- **Physically separated facility:**
  - Separated bike lane or shared-use path, separated from traffic by parking, posts, curb, etc.
  - For two-way facility: 10 to 12 ft preferred, 8 ft minimum
- **Bike lane:** 5 to 7 ft
- **Buffered bike lane:** 8 to 9 ft total

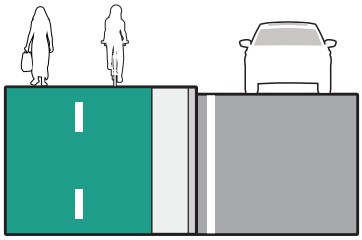
CHART REFERENCES

- Transitions are based on a shift in the 2010 Highway Capacity Manual (HCM 2010) bike Level of Service (LOS) from A to B (assuming no parking, 12 ft outside travel lane, 6 ft bike lane, 8 ft buffered bike lane). This roughly translates to a C to D transition with on-street parking (8 ft parking lane).
- Speed thresholds based on Level of Traffic Stress. "Interested but Concerned" riders are sensitive to increases in volume or speed. Source: Dill, J. McNeil, N. "Revisiting the Four Types of Cyclists: Findings from a National Survey" Transportation Research Board 95th Annual Meeting, 2016.

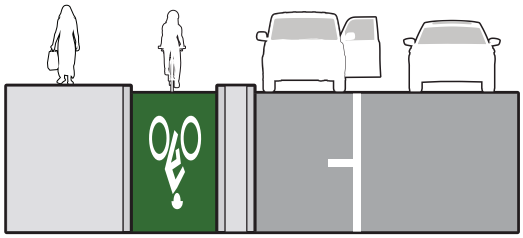
FACILITY TYPES

BICYCLE FACILITY OVERVIEW

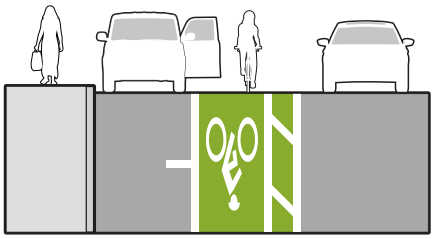
Multi-Use Path Class I — MUP



Separated Bike Lane Class IV — SBL



Buffered Bike Lane Class II — BBL



TYPICAL APPLICATION

Multi-use paths will generally be considered on any road with one or more of the following characteristics:

+ Total traffic lanes: 3 lanes or greater
+ Posted speed limit: 30 mph or greater
+ Average Daily Traffic: 9,000 vehicles or greater
+ Parking turnover: frequent
+ Bike lane obstruction: likely to be frequent
+ Streets that are designated as truck or bus routes

Multi-use paths are shared with pedestrians and may be preferable to separated bike lanes in low density areas where pedestrians volumes are anticipated to be fewer than 200 people per hour on the path.

Separated bike lanes will generally be considered on any road with one or more of the following characteristics:

+ Total traffic lanes: 3 lanes or greater
+ Posted speed limit: 30 mph or more
+ Average Daily Traffic: 9,000 vehicles or greater
+ Parking turnover: frequent
+ Bike lane obstruction: likely to be frequent
+ Streets that are designated as truck or bus routes

Preferred in higher density areas, adjacent to commercial and mixed-use development, and near major transit stations or locations where observed or anticipated pedestrian volumes will be higher.

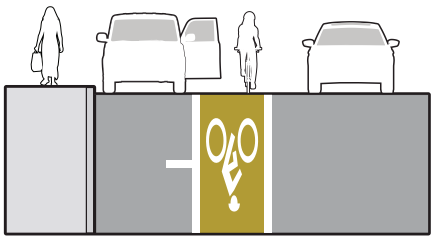
Buffered bike lanes will generally be considered on any road with one or more of the following characteristics:

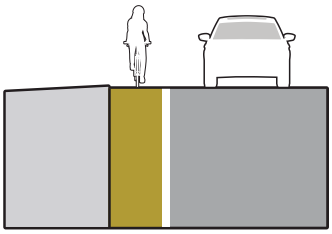
+ Total traffic lanes: 3 lanes or fewer
+ Posted speed limit: 30 mph or lower
+ Average Daily Traffic: 9,000 vehicles or fewer
+ Parking turnover: infrequent.
+ Bike lane obstruction: likely to be infrequent
+ Where a separated bike lane or sidepath is infeasible or not desirable

BICYCLE FACILITY OVERVIEW

Bike Lane
Class II

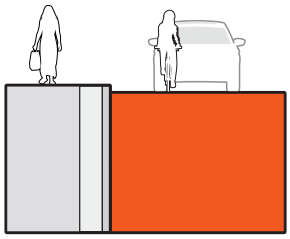
BL





Shared Roadway
Class III

SR



TYPICAL APPLICATION

Conventional bike lanes will generally be considered on any road with one or more of the following characteristics:

+ Total traffic lanes: 3 lanes or fewer
+ Posted speed limit: 30 mph or lower
+ Average Daily Traffic: 9,000 vehicles or fewer
+ Parking turnover: infrequent
+ Bike lane obstruction: likely to be infrequent
+ Where a separated bike lane or sidepath is infeasible or not desirable

Shared Roadways will generally be considered on any road with one or more of the following characteristics:

+ Total traffic lanes: 2 lanes or fewer
+ Posted speed limit 25 mph or lower
+ Average Daily Traffic: 3,000 vehicles or fewer
+ Parking turnover: very infrequent
+ Bike Lane Obstruction: N/A

When paired with traffic calming measures this facility type is known as a bicycle boulevard and can provide a low stress environment

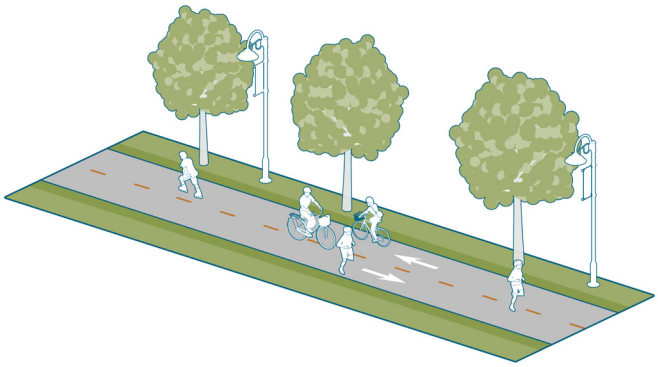
MULTI-USE PATHS (CLASS I)

A Multi-use path is a two-way facility physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Multi-use paths are often located in an independent alignment, such as a greenbelt or abandoned railroad. However, they are also regularly constructed along roadways; often bicyclists and pedestrians will have increased interactions with motor vehicles at driveways and intersections on these "Multi-use paths."

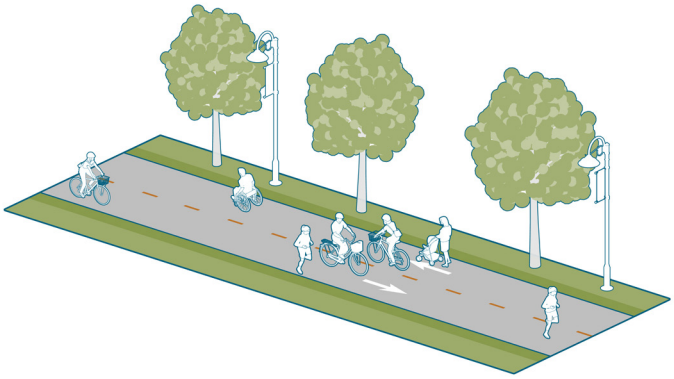
San Ramon Example: Iron Horse Trail and Cross Valley Trail

CONSIDERATIONS

- According to the AASHTO, "Multi-use paths should not be used to preclude on-road bicycle facilities, but rather to supplement a network of on-road bike lanes, shared roadways, bicycle boulevards, and paved shoulders." In other words, in some situations it may be appropriate to provide an on-road bikeway in addition to a multi-use path along the same roadway.
- Many people express a strong preference for the separation between bicycle and motor vehicle traffic provided by paths when compared to on-street bikeways. Multi-use paths may be desirable along high-volume or high-speed roadways, where accommodating the targeted type of bicyclist within the roadway in a safe and comfortable way is impractical. However, mulit-use paths may present increased conflicts between path users and motor vehicles at intersections and driveway crossings. Conflicts can be reduced by minimizing the number of driveway and street crossings present along a path and otherwise providing high-visibility crossing treatments.
- Paths typically have a lower design speed for bicyclists than on-street facilities and may not provide appropriate accommodation for more confident bicyclists who desire to travel at greater speeds. In addition, greater numbers of driveways or intersections along a multi-use path corridor can decrease bicycle travel speeds and traffic signals can increase delay for bicyclists on off-street paths compared to cyclists using in-street bicycle facilities such as bike lanes. Therefore, paths should not be considered a substitute to accommodating more confident bicyclists within the roadway.



Path Width for One-way Passing



Path Width for Two-way Passing

REFERENCES

AASHTO Guide for the Development of Bicycle Facilities (2012)

FHWA Shared-Use Path Level of Service Calculator (2006)

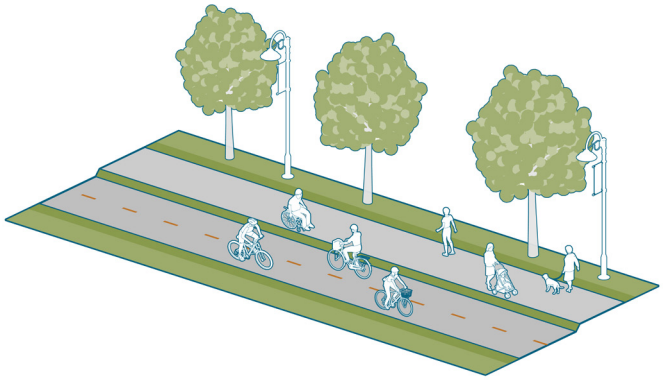
Manual on Uniform Traffic Control Devices (2009)

PATH WIDTH CONSIDERATIONS

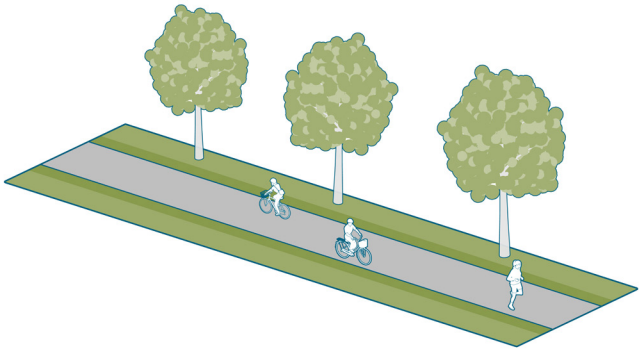
Path width should be determined based on three main characteristics: the number of users, the types of users, and the differences in their speeds. For example, a path that is used by higher-speed bicyclists and children walking to school may experience conflicts due to their difference in speeds. By widening the path to provide space to accommodate passing movements, conflicts can be reduced.

CONSIDERATIONS

- Widths as narrow as 8 feet are acceptable for short distances under physical constraint. Warning signs should be considered at these locations.
- In locations with heavy volumes or a high proportion of pedestrians, widths exceeding 10 feet are recommended. A minimum of 11 feet is required for users to pass with a user traveling in the other direction. It may be beneficial to separate bicyclists from pedestrians by constructing parallel paths for each mode.
- Paths must be designed according to state and national standards. This includes establishing a design speed (typically 18 mph) and designing path geometry accordingly. Consult the AASHTO Guide for the Development of Bicycle Facilities for guidance on geometry, clearances, traffic control, railings, drainage, and pavement design.
- On hard surfaces it can be useful to include soft surface parallel paths which are preferred by some users, such as runners.
- Path clearances are an important element in path design and reducing user conflicts. Vertical objects close to the path edge can endanger users and reduce the comfortable usable width of the path. Along the path, vertical objects should be set back at least two feet from the edge of the path. Path shoulders may also reduce conflicts by providing space for users who step off the path to rest, allowing users to pass one another, or providing space for viewpoints.



Multi-use Path Physical Separation



Minimum Path Width Limits Passing

REFERENCES

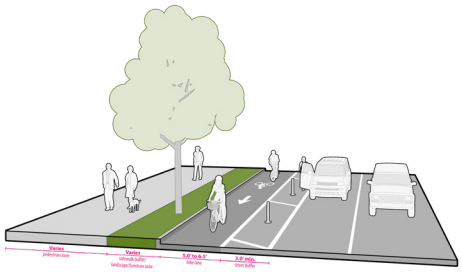
AASHTO Guide for the Development of Bicycle Facilities (2012)

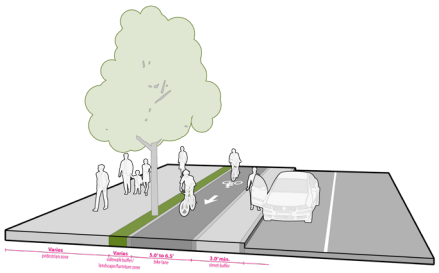
FHWA Shared-Use Path Level of Service Calculator (2006)

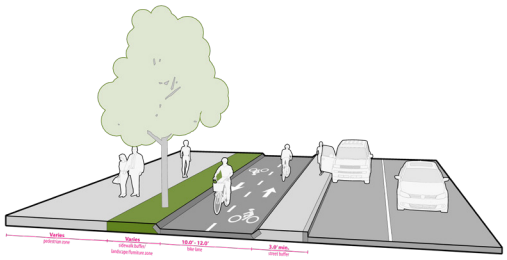
Manual on Uniform Traffic Control Devices (2009)

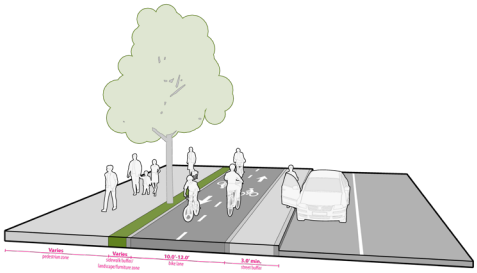
SEPARATED BIKE LANES (CLASS IV)

Separated Bike Lanes are an exclusive bikeway facility type that combines the user experience of a multi-use path with the on-street infrastructure of a conventional bike lane. They are physically separated from motor vehicle traffic and distinct from the sidewalk.









CONSIDERATIONS

Separated bike lanes are more attractive to a wider range of bicyclists than striped bikeways on higher volume and higher speed roads. They eliminate the risk of a bicyclist being hit by an opening car door and prevent motor vehicles from driving, stopping or waiting in the bikeway. They also provide greater comfort to pedestrians by separating them from bicyclists operating at higher speeds.

Separated bike lanes can provide different levels of separation:

+ Separated bike lanes with flexible delineator posts ("flex posts") alone offer the least separation from traffic and are appropriate as interim solution.
+ Separated bike lanes that are raised with a wider buffer from traffic provide the greatest level of separation from traffic, but will often require road reconstruction.
+ Separated bike lanes that are protected from traffic by a row of on-street parking offer a high-degree of separation.

GUIDANCE

Separated bike lanes can generally be considered on any road with one or more of the following characteristics:

+ Traffic lanes: 3 lanes or greater.
+ Posted speed limit: 30 mph or more.
+ Traffic: 9,000 vehicles per day or greater.
+ On-Street parking turnover: frequent.
+ Bike lane obstruction: likely to be frequent.
+ Streets that are designated as truck or bus routes.

Separated bike lanes are preferred over multi-use paths in higher density areas, commercial and mixed-use development, and near major transit stations or locations where pedestrian volumes are anticipated to exceed 200 people per hour on a shared use path.

REFERENCES

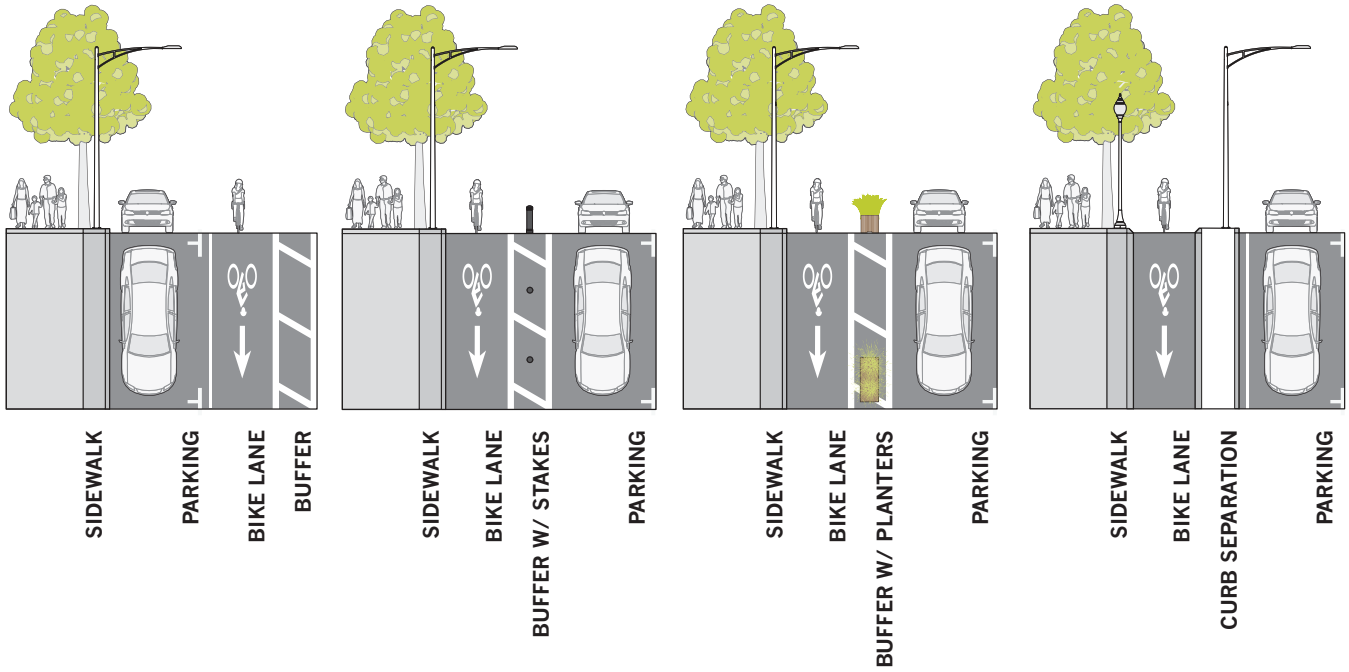
NACTO. Urban Bikeway Design Guide. 2nd Edition.

MassDOT. Separated Bike Lane Planning and Design Guide. 2015

Caltrans. Class IV Bikeway Guidance (Separated Bikeways/Cycle Tracks). 2015.

LIFE OF A SEPARATED BIKE LANE

Separated bike lanes have been implemented in many cases as low-cost retrofit projects (e.g. using flex posts and paint within the existing right-of-way). More permanent forms of separation, such as curb-protected bike lanes, cost more and are less flexible once implemented. A phased implementation approach, where "pilot" projects transition to permanent protected bike lanes may solve both of these problems, by implementing the facility slowly and troubleshooting before permanent materials and high costs are necessary.



Progression from pilot project to separated bike lane

CONSIDERATIONS

Lower-cost retrofits or demonstration projects allow for quick implementation, responsiveness to public perception and ongoing evaluation. Separation types for short-term separated bike lane designs often include non-permanent separation, such as flexible delineator posts, planters or parking stops. Pilot projects allow the agency to:

- Test the separated bike lane configuration for bicyclists and traffic operations
- Evaluate public reaction, design performance, and safety effectiveness
- Make changes if necessary
- Transition to permanent design

GUIDANCE

- Permanent separation designs provide a high level of protection and often have greater potential for placemaking, quality aesthetics, and integration with features such as green stormwater infrastructure.
- Agencies often implement permanent separation designs by leveraging private development (potentially through developer contribution), major capital construction, and including protected bike lanes in roadway reconstruction designs.
- Examples of permanent separation materials include rigid bollards, raised medians and grade-protected bike lanes at an intermediate or sidewalk level.

REFERENCES

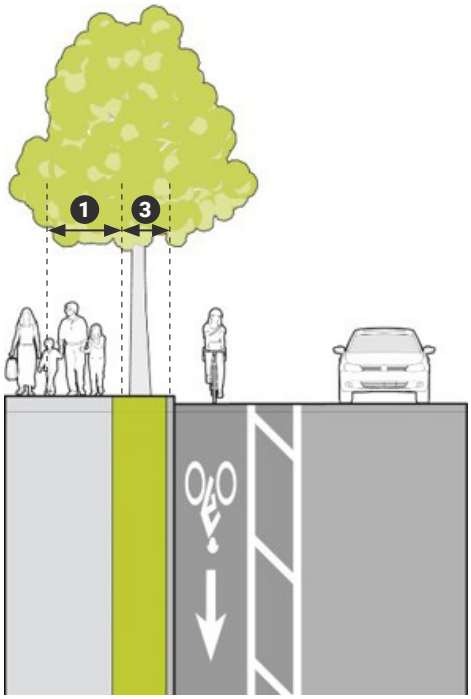
NACTO Urban Street Design Guide. 2013.

FHWA Protected Bike Lane Planning and Design Guide. 2015.

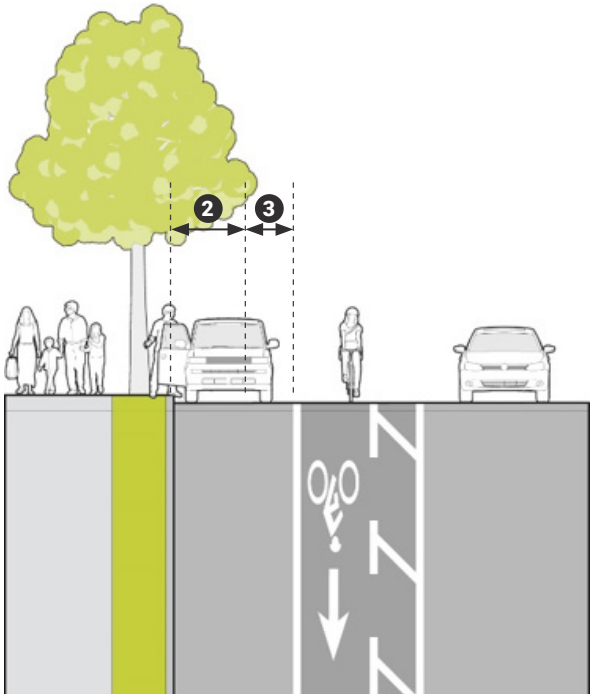
Caltrans. Class IV Bikeway Guidance (Separated Bikeways/Cycle Tracks). 2015.

BUFFERED BIKE LANES (CLASS II)

Buffered bicycle lanes are created by painting or otherwise creating a flush buffer zone between a bicycle lane and the adjacent travel lane. While buffers are typically used between bicycle lanes and motor vehicle travel lanes to increase bicyclists' comfort, they can also be provided between bicycle lanes and parking lanes in locations with high parking turnover to discourage bicyclists from riding too close to parked vehicles.



Buffered Bike Lane Adjacent to a Curb



Buffered Bike Lane Adjacent to Parking

CONSIDERATIONS

+ Preferable to a conventional bicycle lanes when used as a contra-flow bike lane on one-way streets.
+ Typically installed by reallocating existing street space.
+ Can be used on one-way or two-way streets.
+ Consider placing buffer next to parking lane where there is commercial or metered parking.
+ Consider placing buffer next to travel lane where speeds are 30 mph or greater or when traffic volume exceeds 6,000 vehicles per day.
+ Where there is 7 feet of roadway width available for a bicycle lane, a buffered bike lane should be installed instead of a conventional bike lane.
+ Buffered bike lanes allow bicyclists to ride side by side or to pass slower moving bicyclists.
+ Research has documented buffered bicycle lanes increase the perception of safety.

GUIDANCE

1. The minimum width of a buffered bike lane adjacent to parking is 5 feet, a desirable width is 6 feet.
2. Buffers are to be broken where curbside parking is present to allow cars to cross the bike lane.
3. The minimum buffer width is 18 inches. There is no maximum. Diagonal cross hatching should be used for buffers <3 feet in width. Chevron cross hatching should be used for buffers >3 feet in width.

REFERENCES

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

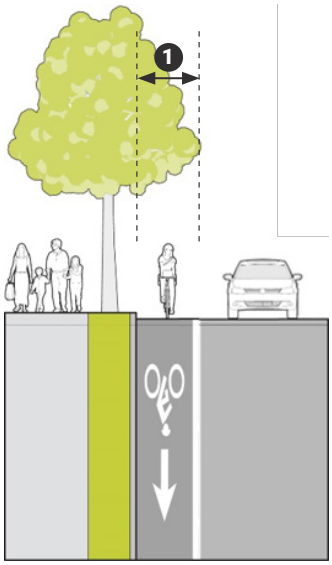
NACTO. *Urban Bikeway Design Guide.* 2nd Edition.

Portland State University, Center for Transportation Studies. *Evaluation of Innovative Bicycle Facilities: SW Broadway Cycle Track & SW Stark/Oak Street Buffered Bike Lanes FINAL REPORT.* 2011.

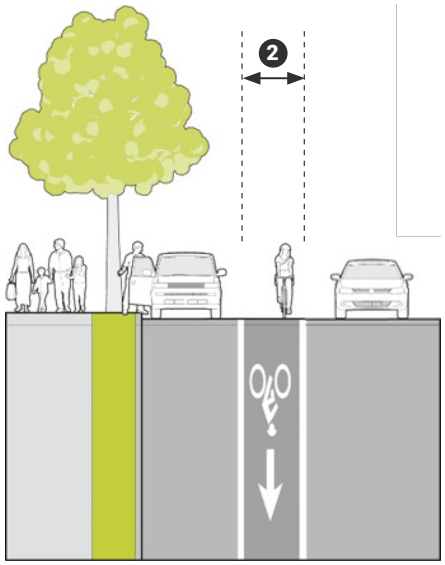
BIKE LANES (CLASS II)

Bicycle lanes provide an exclusive space for bicyclists in the roadway. Bicycle lanes are established through the use of lines and symbols on the roadway surface. Bicycle lanes are for one-way travel and are normally provided in both directions on two-way streets and/or on one side of a one-way street. Bicyclists are not required to remain in a bicycle lane when traveling on a street and may leave the bicycle lane as necessary to make turns, pass other bicyclists, or to properly position themselves for other necessary movements. Bicycle lanes may only be used temporarily by vehicles accessing parking spaces and entering and exiting driveways and alleys. Stopping, standing and parking in bike lanes is prohibited.

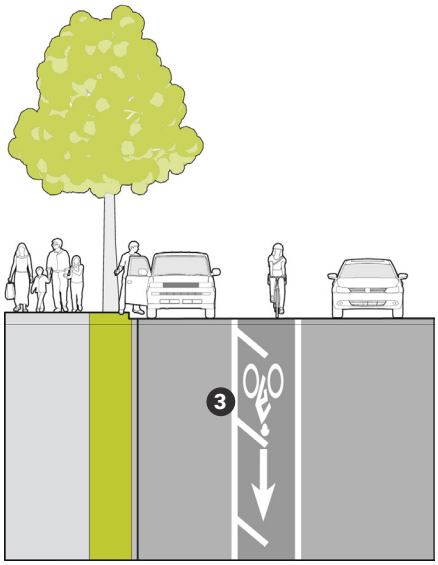
San Ramon Example: South Monarch Road



Bike Lane Adjacent to Parking



Bike Lane Adjacent to a Curb



Bike Lane with Door Zone Marking

CONSIDERATIONS

+ Typically installed by reallocating existing street space.
+ Can be used on one-way or two-way streets.
+ Contra-flow bicycle lanes may be used to allow two-way bicycle travel on streets designated for one-way travel for motorists to improve bicycle network connectivity.
+ Stopping, standing and parking in bike lanes may be problematic in areas of high parking demand and deliveries, especially in commercial areas.
+ Wider bike lanes or buffered bike lanes are preferable at locations with high parking turnover.

GUIDANCE

1. The minimum width of a bike lane adjacent to a curb is 5 feet exclusive of a gutter; a desirable width is 6 feet.
2. The minimum width of a bike lane adjacent to parking is 5 feet; a desirable width is 6 feet.
3. Parking T's or hatch marks can highlight the door zone on constrained corridors with high parking turnover to guide bicyclists away from doors.

REFERENCES

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

NACTO. Urban Bikeway Design Guide. 2nd Edition.

BICYCLE BOULEVARD (CLASS III)

Bicycle boulevards are applied on quiet streets, often through residential neighborhoods. These treatments are designed to prioritize bicycle through-travel, while calming motor vehicle traffic and maintaining relatively low motor vehicle speeds. Treatments vary depending on context, but often include elements of traffic calming, including traffic diverters, speed attenuators such as speed humps or chicanes, pavement markings, and signs. Bicycle boulevards are also known as neighborhood greenways, neighborhood bikeways, among other locally-preferred terms.

CONSIDERATIONS

Many cities already have signed bike routes along neighborhood streets that provide an alternative to traveling on high-volume, high-speed arterials. Applying bicycle boulevard treatments to these routes makes them more suitable for bicyclists of all abilities and can reduce crashes.

Stop signs or traffic signals should be placed along the bicycle boulevard in a way that prioritizes the bicycle movement, minimizing stops for bicyclists whenever possible.

Bicycle boulevard treatments include traffic calming measures such as street trees, traffic circles, chicanes, and speed humps. Traffic management devices such as diverters or semi-diverters can redirect cut-through vehicle traffic and reduce traffic volume while still enabling local access to the street.

Communities should begin by implementing bicycle boulevard treatments on one pilot corridor to measure the impacts and gain community support. The pilot program should include before-and-after crash studies, motor vehicle counts, and bicyclist counts on both the bicycle boulevard and parallel streets. Findings from the pilot program can be used to justify bicycle boulevard treatments on other neighborhood streets.

Additional treatments for major street crossings may be needed, such as median refuge islands, rectangular rapid flashing beacons, bicycle signals, and HAWK or half signals.

GUIDANCE

Bicycle boulevards can generally be considered on any road with one or more of the following characteristics:

- Maximum Average Daily Traffic (ADT): 3,000
- Preferred ADT: up to 1,000
- Target speeds for motor vehicle traffic are typically around 20 mph; there should be a maximum < 15 mph speed differential between bicyclists and vehicles.

REFERENCES

AASHTO Guide for the Development of Bicycle Facilities. 2012.

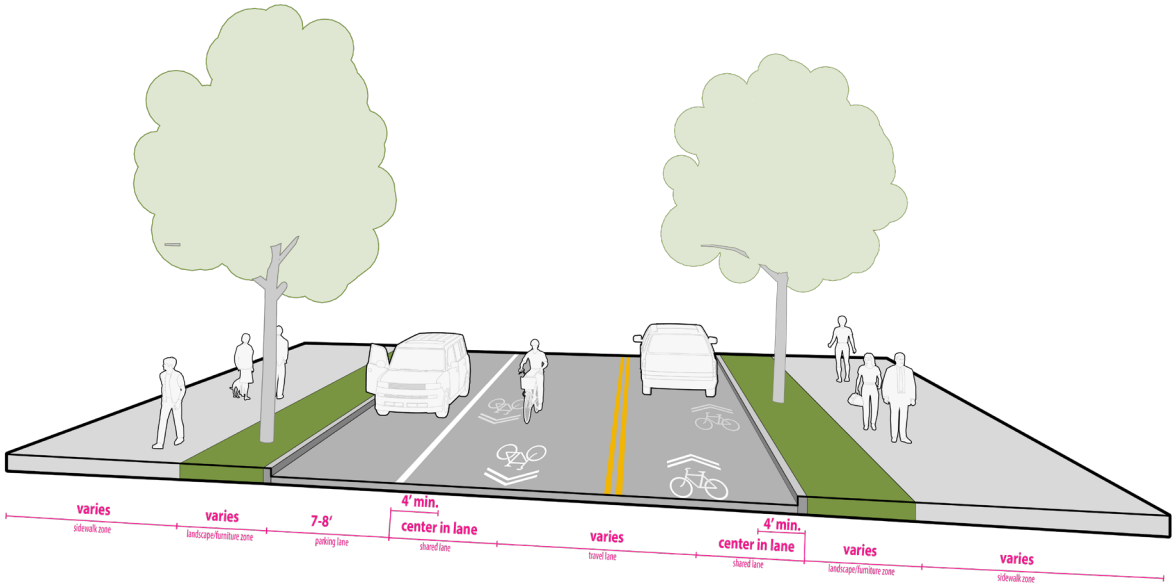
NACTO Urban Bikeway Design Guide. 2012.

Manual on Uniform Traffic Control Devices. 2009.

Fundamentals of Bicycle Boulevard Planning & Design. 2009.

SHARED LANE MARKINGS: SHARROWS (CLASS III)

Shared lane markings (or "sharrows") are pavement markings that denote shared bicycle and motor vehicle travel lanes. The markers are two chevrons positioned above a bicycle symbol, placed where the bicyclist should be anticipated to operate. In general, this is a design solution that should only be used in locations with low traffic speeds and volumes as part of a signed route, bicycle boulevard, or as a temporary solution on constrained, higher-traffic streets until additional right-of-way can be acquired.



CONSIDERATIONS

- Typically used on local, collector, or minor arterial streets with low traffic volumes. Commonly used on bicycle boulevards to reinforce the priority for bicyclists.
- Typically feasible within existing right-of-way and pavement width even in constrained situations that preclude dedicated facilities.
- May be used as interim treatments to fill gaps between bike lanes or other dedicated facilities for short segments where there are space constraints.
- May be used for downhill bicycle travel in conjunction with climbing lanes intended for uphill travel.
- Typically supplemented by signs, especially Bikes May Use Full Lane (R4-11).

GUIDANCE

- Intended for use only on streets with posted speed limits of up to 25 mph and traffic volumes of less than 4,000 vehicles per day.
- The marking's centerline must be at least 4 feet from curb where parking is prohibited.
- The marking's centerline must be at least 11 feet from curb where parking is permitted, so that it is outside the door zone of parked vehicles.
- For narrow lanes, it may be desirable to center shared lane markings along the centerline of the outside travel lane.

REFERENCES

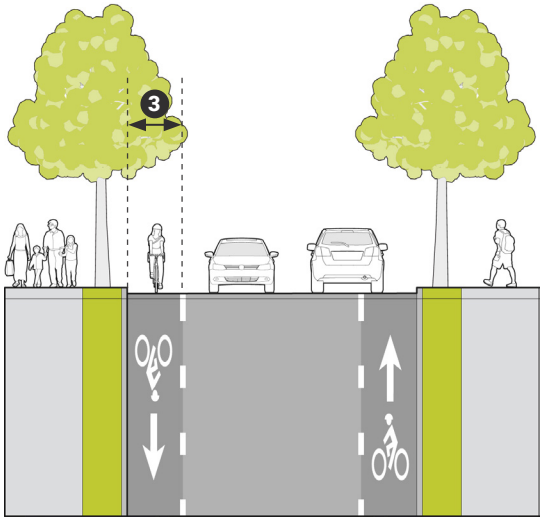
AASHTO Guide for the Development of Bicycle Facilities (2012)

NACTO Urban Bikeway Design Guide (2012)

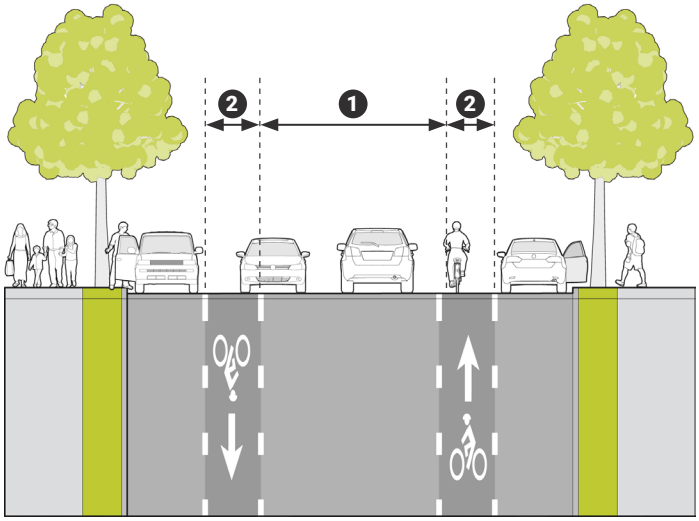
Manual on Uniform Traffic Control Devices (2009)

ADVISORY BIKE LANES (CLASS III)

Advisory bicycle lanes (ABLs) are used to create narrow streets where bicyclists are provided priority movement and motorists are compelled to yield to bicyclists as well as drivers approaching in the opposing direction. ABLs use dotted lane lines, allowing motorists to enter them to yield and are designed using dimensions based on conventional bicycle lanes. ABLs are reserved for use on low-volume, low-speed streets.



Advisory Bike Lane without Parking



Advisory Bike Lane with Parking

CONSIDERATIONS

+ **Treatment requires FHWA permission to experiment.**
+ For use on streets too narrow for bike lanes and normal--width travel lanes.
+ Provide two separate minimum-width bicycle lanes, on either side of a single shared (unlaned) two-way "yielding" motorist travel space.
+ Motorists must yield to on-coming motor vehicles by pulling into the bicycle lane.
+ To reduce motorist speeds, and to encourage yielding, the unmarked space between the two advisory bike lanes should be no wider than 18 feet.
+ This treatment should only be used on streets with >60% continuous daytime parking occupancy.
+ Where parking occupancy is continuously <50%, it is preferable to consolidate it to one side of the street or remove it.
+ A Two-Way Traffic warning sign (W6-3) may increase motorists understanding of the intended two-way operation of the street.

GUIDANCE

1. The minimum width of the unlaned motorist space should be 12 feet between the bicycle lanes. The maximum width should be no more than 18 feet.
2. The minimum width of an advisory bike lane adjacent to parking is 5 feet; a desirable width is 6 feet.
3. The minimum width of an advisory bike lane adjacent to a curb is 5 feet exclusive of a gutter; a desirable width is 6 feet.

Advisory bikeways can generally be considered on any road with one or more of the following characteristics:

+ Traffic lanes: 2 lanes or less
+ Posted speed limit: 25 mph or less
+ Traffic: 6,000 vehicles per day or less, or 300 vehicles or less during the peak hour
+ On-Street parking turnover: infrequent
+ Street is not a designated truck or bus route

REFERENCES

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

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/dashed_bike_lanes.cfm

Photo: City of Portland, OR

BICYCLE INTERSECTION DESIGN & SPOT TREATMENTS

BIKE BOXES

A bicycle box provides dedicated space between the crosswalk and vehicle stop line where bicyclists can wait during the red light at signalized intersections. The bicycle box allows a bicyclist to take a position in front of motor vehicles at the intersection, which improves visibility and motorist awareness, and allows bicyclists to "claim the lane" if desired. Bike boxes aid bicyclists in making turning maneuvers at the intersection, and provide more queuing space for multiple bicyclists than that provided by a typical bicycle lane.

CONSIDERATIONS

- Bicycle boxes are typically painted green and are a minimum of 10 feet in depth.
- Bicycle box design should be supplemented with appropriate signage according to latest version of the MUTCD.
- Bicycle box design should include appropriate adjustment in determining the minimum green time.
- Where right turn lanes for motor vehicles exist, bicycle lanes should be designed to the left of the turn lane. If right turns on red are permitted, consider ending the bicycle box at the edge of the bicycle lane to allow motor vehicles to make this turning movement.

GUIDANCE

- In locations with high volumes of turning movements by bicyclists, a bicycle box should be used to allow bicyclists to shift towards the desired side of the travel way. Depending on the position of the bicycle lane, bicyclists can shift sides of the street to align themselves with vehicles making the same movement through the intersection.
- In locations where motor vehicles can continue straight or cross through a right-side bicycle lane while turning right, the bicycle box allows bicyclists to move to the front of the traffic queue and make their movement first, minimizing conflicts with the turning vehicle. When a bicycle box is implemented in front of a vehicle lane that previously allowed right turns on red, the right turn on red movement must be restricted using signage and enforcement once a bike box is installed.

REFERENCES

NACTO Urban Bikeway Design Guide - Bike Boxes. 2012.

FHWA Separated Bike Lane Planning and Design Guide. 2015.

MassDOT Separated Bike Lane Planning & Design Guide. 2016.

MIXING ZONES

A mixing zone requires turning motorists to merge across a separated bike lane at a defined location in advance of an intersection. Unlike a standard bike lane, where a motorist can merge across at any point, a mixing zone design limits bicyclists' exposure to motor vehicles by defining a limited merge area for the turning motorist. Mixing zones are compatible only with one-way separated bike lanes.

CONSIDERATIONS

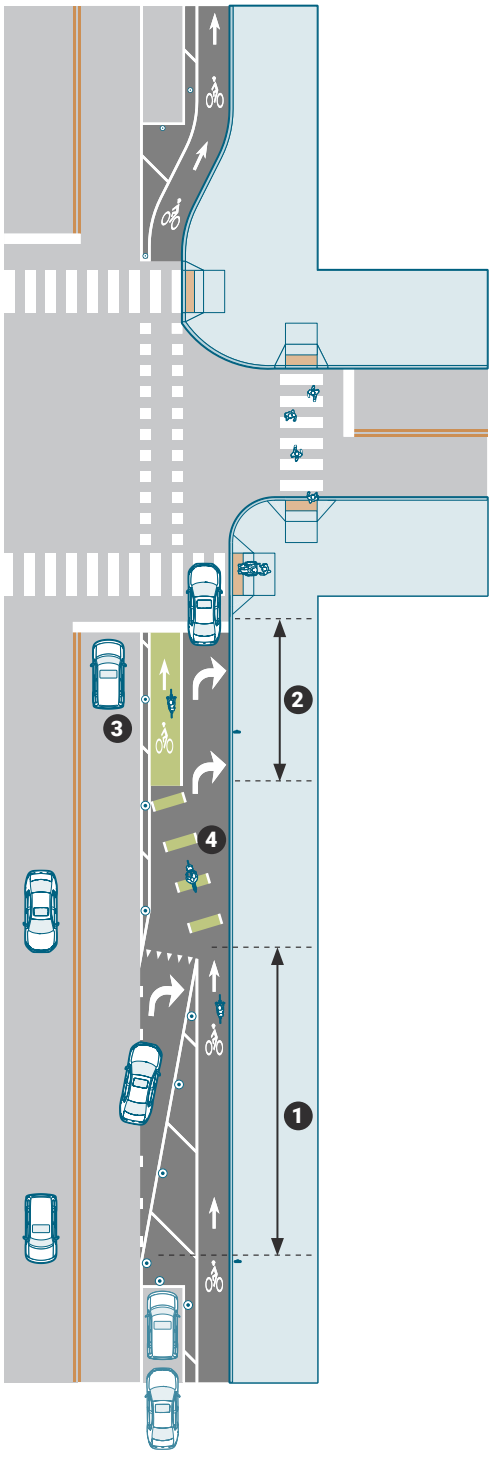
Protected intersections are preferable to mixing zones. Mixing zones are generally appropriate as an interim solution or in situations where severe right-of-way constraints make it infeasible to provide a protected intersection.

Mixing zones are only appropriate on street segments with one-way separated bike lanes. They are not appropriate for two-way separated bike lanes due to the contra-flow bicycle movement.

GUIDANCE

1. Locate merge points where the entering speeds of motor vehicles will be 20 mph or less by (a) minimizing the length of the merge area and (b) locating the merge point as close as practical to the intersection.
2. Minimize the length of the storage portion of the turn lane.
3. Provide a buffer and physical separation (e.g. flexible delineator posts) from the adjacent through lane after the merge area, if feasible.
4. Highlight the conflict area with green surface coloring and dashed bike lane markings, as necessary, or shared lane markings placed on a green box.

+ Provide a "Begin right (or left) turn lane yield to bikes" sign (R4-4) at the beginning of the merge area.
+ Restrict parking within the merge area.
+ At locations where raised separated bike lanes approach the intersection, the bike lane should transition to street elevation at the point where parking terminates.
+ Where posted speeds are 35 mph or higher, or at locations where it is necessary to provide storage for queued vehicles, it may be necessary to provide a deceleration/storage lane in advance of the merge point.



REFERENCES

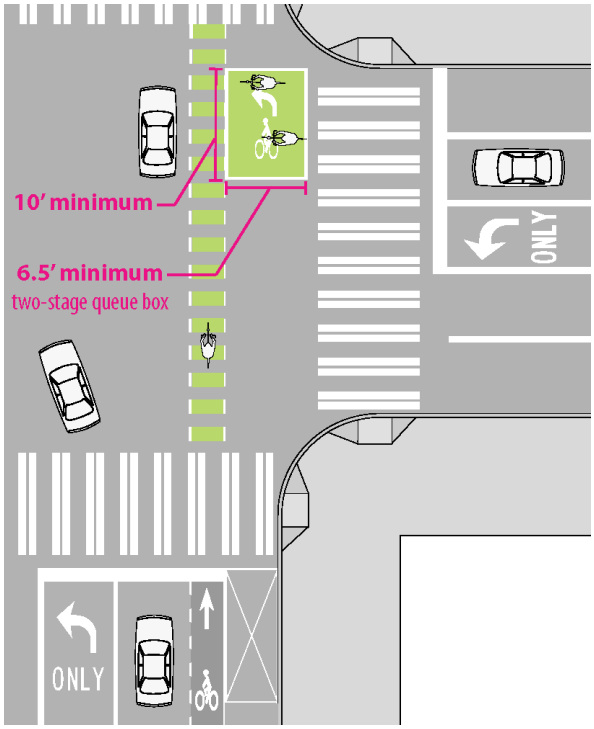
NACTO. *Urban Bikeway Design Guide. 2012.*

MassDOT. Separated Bike Lane Planning and Design Guide. 2015.

FHWA. Separated Bike Lane Planning and Design Guide. 2015.

TWO-STAGE TURN QUEUE BOX

A two-stage turn queue box should be considered where separated bike lanes are continued up to an intersection and a protected intersection is not provided. The two-stage turn queue box designates a space for bicyclists to wait while performing a two-stage turn across a street at a location outside the path of traffic.



CONSIDERATIONS

This treatment has been granted interim approval by FHWA and Caltrans.

- Two-stage turn queue box dimensions will vary based on the street operating conditions, the presence or absence of a parking lane, traffic volumes and speeds, and available street space. The turn box may be placed in a variety of locations including in front of the pedestrian crossing (the crosswalk location may need to be adjusted), in a 'jug-handle' configuration within a sidewalk, or at the tail end of a parking lane or a median island.
- Dashed bike lane extension markings may be used to indicate the path of travel across the intersection.

GUIDANCE

- A minimum width of 10 feet is recommended for the queue box.
- A minimum depth of 6.5 feet is recommended for the queue box.
- "No turn on red" (R10-11) restrictions should be used to prevent vehicles from entering the queuing area.
- The use of a supplemental sign instructing bicyclists how to use the box is optional.
- The box should consist of a green box outlined with solid white lines supplemented with a bicycle symbol and a turn arrow to emphasize the crossing direction.

REFERENCES

NACTO. *Urban Bikeway Design Guide. 2nd Edition.*

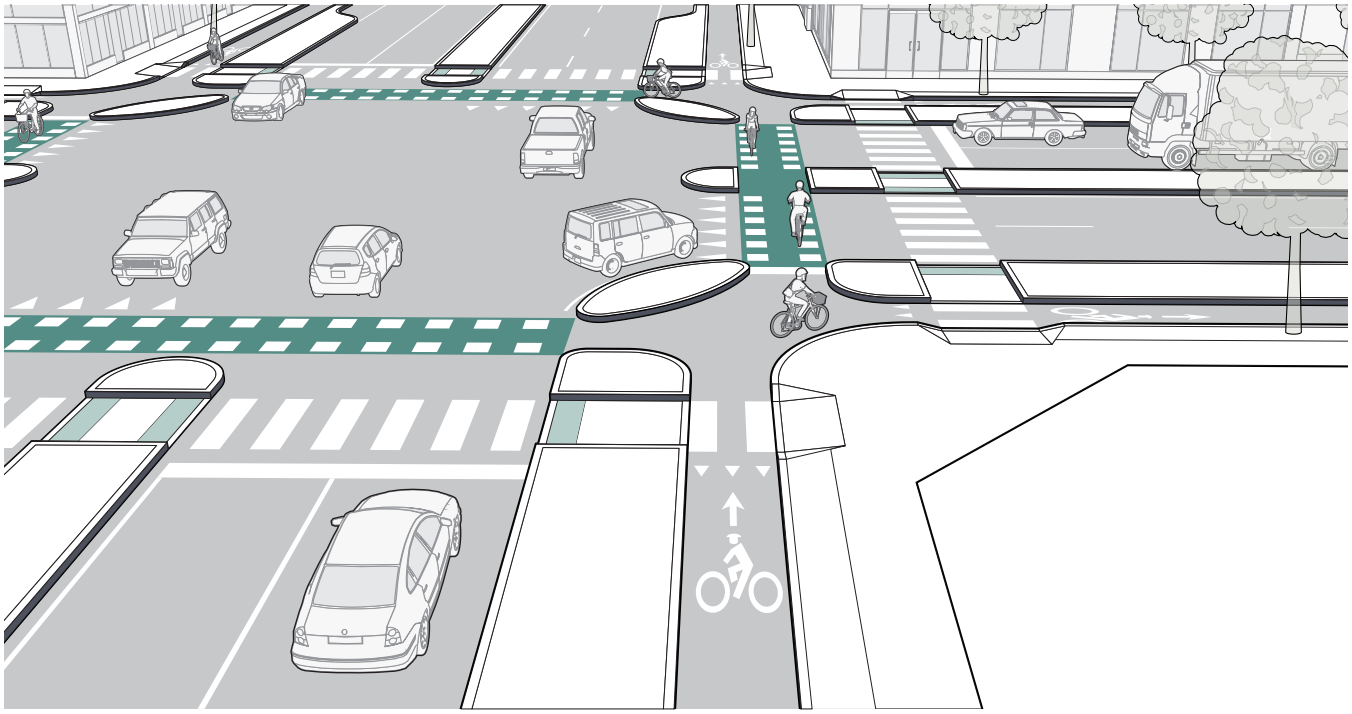
MassDOT. Separated Bike Lane Planning and Design Guide. 2015.

FHWA. Separated Bike Lane Planning and Design Guide. 2015.

FHWA. Bicycle Facilities and the Manual on Uniform Traffic Control Devices - Two-Stage Turn Box. 2015.

SEPARATED BIKE LANES AT INTERSECTIONS

Separated bicycle lanes provide an exclusive travel way for bicyclists alongside roadways that is separate from motor vehicle travel lanes, parking lanes, and sidewalks. Separated bike lane designs at intersections should manage conflicts with turning vehicles and increase visibility for all users.



CONSIDERATIONS

Separated bicycle lane designs at intersections should give consideration to signal operation and phasing in order to manage conflicts between turning vehicles and bicyclists. Bicycle signal heads also should be considered to separate conflicts.

Shared lane markings and/or colored pavement can supplement short dashed lines to demark the protected bike lane through intersections, where engineering judgment deems appropriate.

At non-signalized intersections, design treatments to increase visibility and safety include:

- Warning signs
- Raised intersections
- Special pavement markings (including colored surface treatment)
- Removal of parking prior to the intersection

GUIDANCE

- It is preferable to maintain the separation of the bike lane through the intersection rather than introduce the bicyclist into the street with a merge lane. Where this is not possible, see guidance on Mixing Zones.
- Increasing visibility and awareness are two key design goals for separated bike lanes at intersections. In some cases, parking restrictions between 20' to 40' are needed to ensure the visibility of bicyclists at intersections.
- Separated bike lanes should typically be routed behind transit stops (i.e., the transit stop should be between the bike lane and motor vehicle travel lanes). If this is not feasible, the separated bike lane should be designed to include treatments such as signage and pavement markings to alert the bicyclist to stop for buses and pedestrians accessing transit stops.
- Markings and signage should be used at intersections to give priority to separated bicycle lanes.

REFERENCES

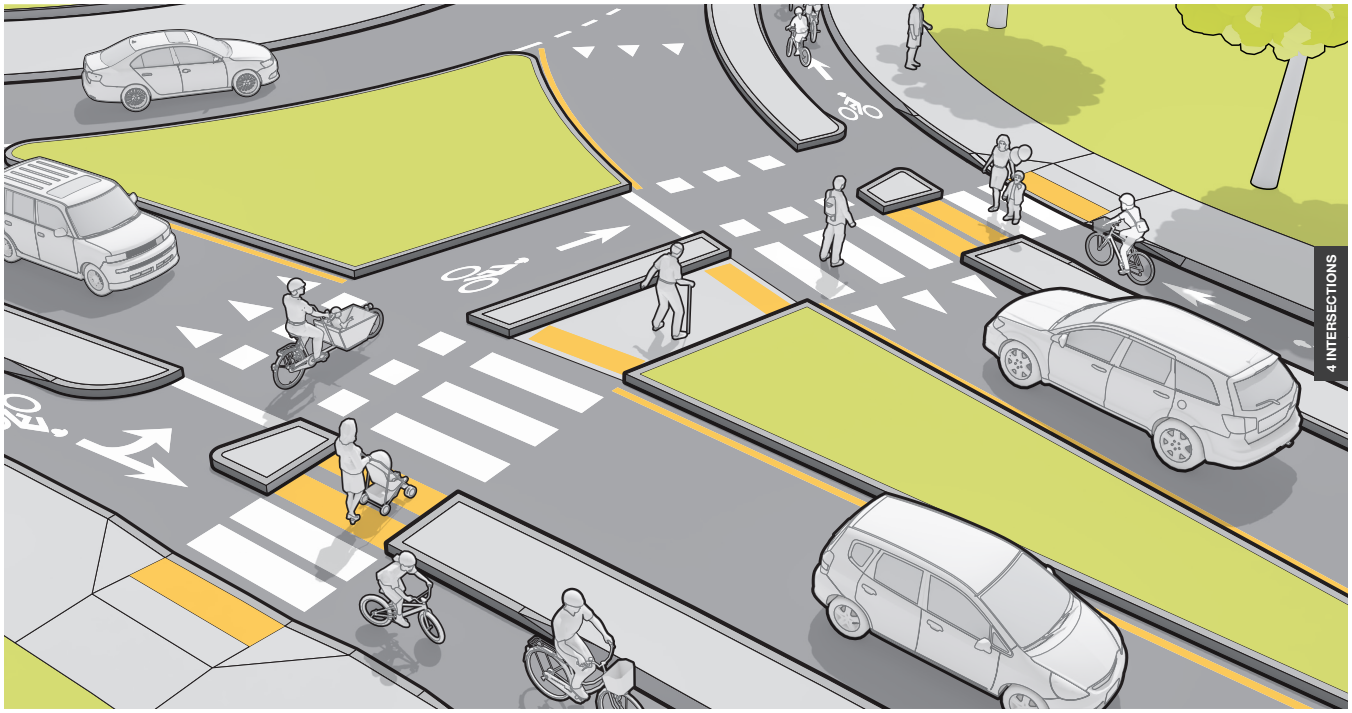
Bicycle Facilities and the Manual on Uniform Traffic Control Devices

NACTO Urban Bikeway Design Guide. 2012.

FHWA Separated Bike Lane Planning and Design Guide. 2015.

SEPARATED BIKE LANES AT ROUNDABOUTS

When separated bike lanes are provided at roundabouts, they should be continuous around the intersection and parallel to the sidewalk. Separated bike lanes should generally follow the contour of the circular intersection.



CONSIDERATIONS

At crossing locations of multi-lane roundabouts or roundabouts where the exit geometry will result in faster exiting speeds by motorists (thus reducing the likelihood that they will yield to bicyclists and pedestrians), additional measures should be considered to induce yielding such as providing an actuated device such as a Rectangular Rapid Flashing Beacon or Pedestrian Hybrid Beacon.

GUIDANCE

- The bicycle crossing should be immediately adjacent to and parallel with the pedestrian crossing, and both should be at the same elevation.
- The separated bike lane approach to the bicycle crossing should result in bicyclists arriving at the queuing area at a perpendicular angle to approaching motorists.
- Consider providing supplemental yield lines at roundabout exits to indicate priority at these crossings.
- The decision of whether to use yield control or stop control at the bicycle crossing should be based on available sight distance.
- Curb radii should be a minimum of 5 feet to enable bicyclists to turn into the queuing area.
- Channelizing islands are preferred to maintain separation between bicyclists and pedestrians, but may be eliminated if different surface materials are used.

REFERENCES

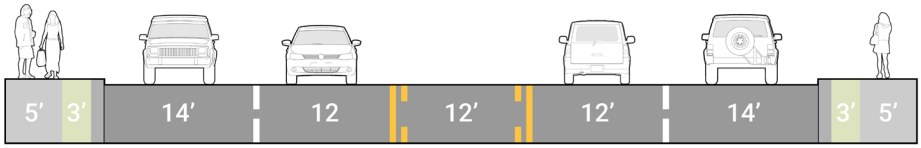
MassDOT Separated Bike Lane Planning & Design Guide. 2016.

SUPPORTIVE ELEMENTS FOR BICYCLE FACILITIES

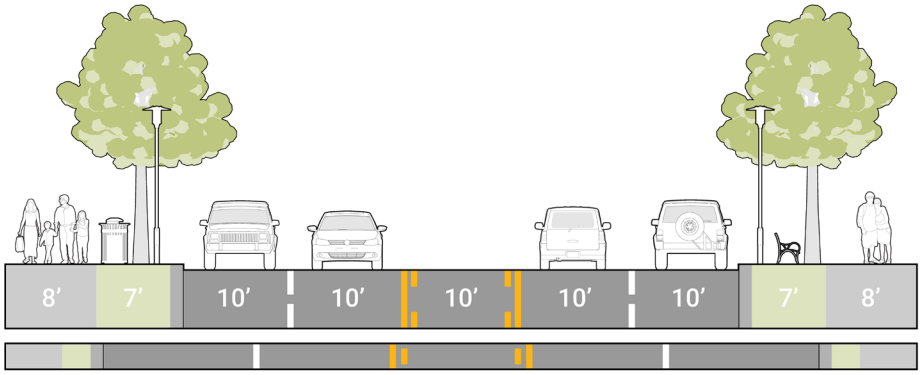
LANE NARROWING

Lane narrowing can improve comfort and safety for vulnerable road users. Narrowing lanes creates space that can be re-allocated to other modes, in the form of wider sidewalks, bike lanes, and buffers between cyclists, pedestrians and motor vehicles. Space can also be dedicated to plantings and amenity zones, and reduces crossing distances at intersections.

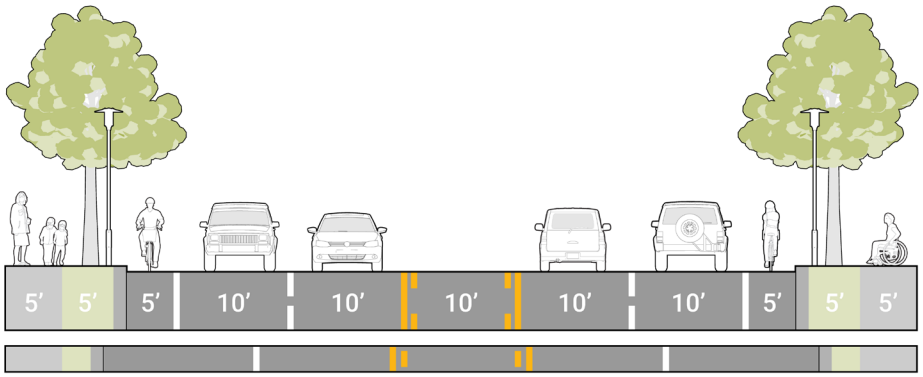
Roadway Before Narrowing



Narrowing Motor Vehicle Lanes to increase Sidewalk and Amenity Zones



Narrowing Motor Vehicle Lanes to increase Amenity Zone and add Bicycle Lanes



GUIDANCE

Narrowing existing motor vehicle lanes may result in enough space to create separated bicycle lanes, widened sidewalks and buffers, or a combination of on-street bike lanes and enhancements to the pedestrian corridor.

Narrower lanes can contribute to lower operating speeds along the roadway, which may be appropriate in dense, walkable corridors.

GUIDANCE

- Motor vehicle travel lanes as narrow as 10 feet are allowed in low-speed environments (45 mph or less) according to the AASHTO Green Book.
- 10-foot travel lanes are not appropriate on 4-lane undivided arterial roadways.

REFERENCES

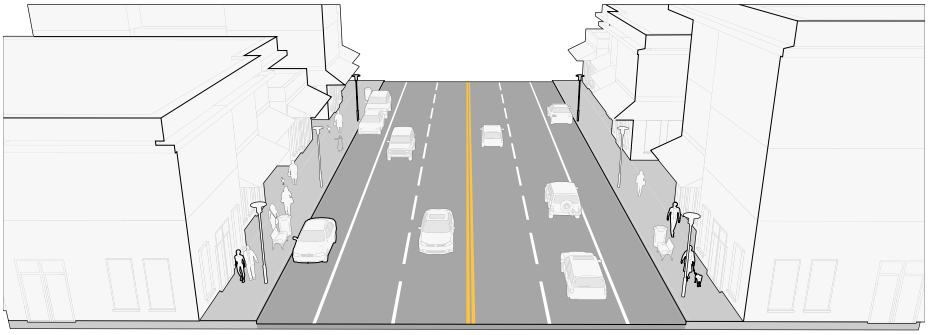
FHWA Achieving Multi-modal Networks: Applying Design Flexibility and Reducing Conflicts. 2016.

AASHTO Green Book. 2011.

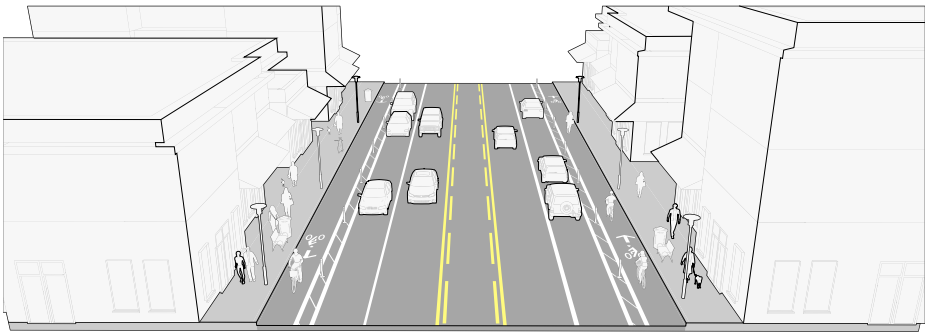
LANE RECONFIGURATION (ROAD DIET)

Road diets are the reconfiguration of one or more travel lanes to calm traffic and provide space for bicycle lanes, turn lanes, streetscapes, wider sidewalks, and other purposes. Four- to three-lane conversions are the most common Road Diet, however, there are numerous types (e.g., three- to two-lanes, or five- to three-lanes).

Typical 4-lane road with on-street parking



Three-lane road diet (with center two-way left-turn lane), with on-street parking and separated bicycle lanes



CONSIDERATIONS

Lane reconfiguration is a great tool for reducing collisions and injuries, improving pedestrian crossings and providing designated space for bicyclists. Road diets improve safety as they reduce conflict points and lead to fewer and less severe collisions.

Lane reconfiguration is possible under the following capacities:

- 3 lane road (one through lane in each direction with a center turn lane): 15,000 or fewer ADT
- 3 lane road (one through lane in each direction with a center turn lane): 20,000 or fewer ADT, traffic study suggested
- 5 lane road (two through lanes in each direction with a center turn lane): 35,000 or fewer ADT, traffic study suggested
- 7 lane road (three through lanes in each direction with a center turn lane): 50,000 or fewer ADT, traffic study suggested

GUIDANCE

Lanes greater than 11 feet should not be used as they may encourage unintended speeding

The following lane widths are recommended for each lane type

- 10 foot wide travel lanes (11 feet for the curb lane is acceptable when on a designated truck or bus route)
- 7-9 foot wide parking lanes

REFERENCES

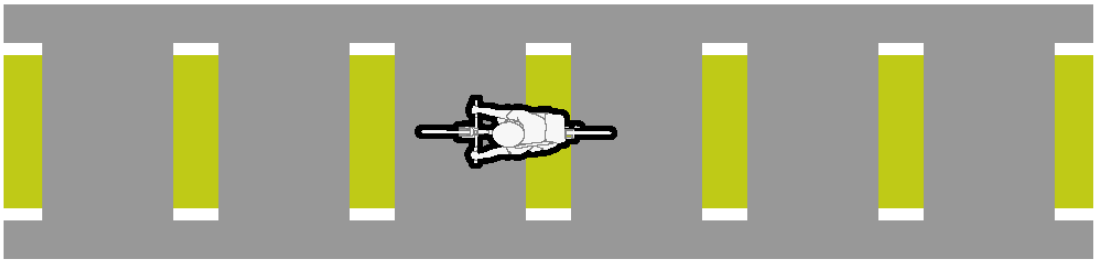
FHWA Road Diet Guide. 2014.

NACTO Urban Street Design Guide .2013.

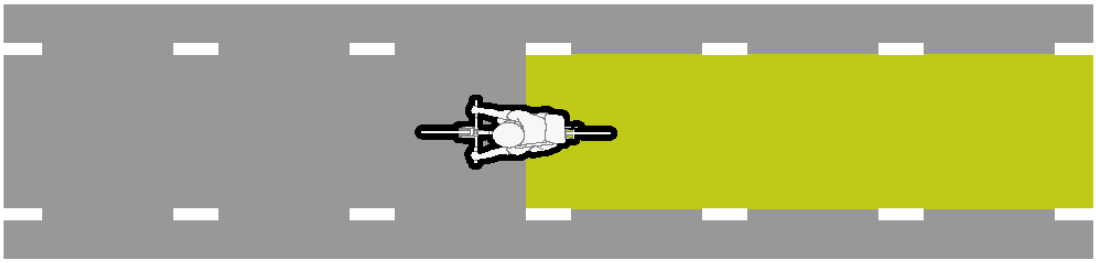
Dr. Ata M. Kahn, P.E., ITE Journal, Washington, D.C.

CONFLICT AREA MARKING

Intersection pavement markings are designed to improve visibility, alert all roadway users of expected behaviors, and to reduce conflicts with turning vehicles.



Colored Dash



Colored Conflict Areas

CONSIDERATIONS

- Dashed lane lines may be sufficient for guiding bicyclists through intersections; however, consider providing enhanced markings with green pavement and/or symbols at complex intersections or at intersections with documented conflicts and safety concerns.
- Symbol placement within intersections should consider vehicle wheel paths to minimize maintenance.
- Driveways with higher volumes may require additional pavement markings and signage.
- Consideration should be given to using intersection pavement markings as spot treatments or standard intersection treatments. A corridor wide treatment can maintain consistency; however, spot treatments can be used to highlight conflict locations.

GUIDANCE

- Dashed white lane lanes should conform to the latest edition of the MUTCD. These can be used through different types of intersections based on engineering judgment.
- A variety of pavement marking symbols can enhance intersection treatments to guide bicyclists and warn of potential conflicts.
- Green pavement markings can be used along the length of a corridor or in select conflict locations.
- Green pavement markings may be applied in a solid or dashed pattern within a dashed bicycle lane to indicate conflict areas and where merging maneuvers are permitted, such as across intersections, driveways, and at STOP or YIELD-controlled cross-streets.
- Green pavement markings shall be placed before the stop bar at the intersection and continue through the intersection; the City of Minneapolis recommends placing the markings at least 30’ before the stop bar. Dashed marking should be aligned with the approaching/receiving bike lane.
- Green dashed pavement markings are typically 2’ by 5’-2” with a 6” white edge.
- The colored markings should be skid-resistant and retro-reflective.

REFERENCES

AASHTO Guide for the Development of Bicycle Facilities. 2012.

NACTO Urban Bikeway Design Guide. 2012.

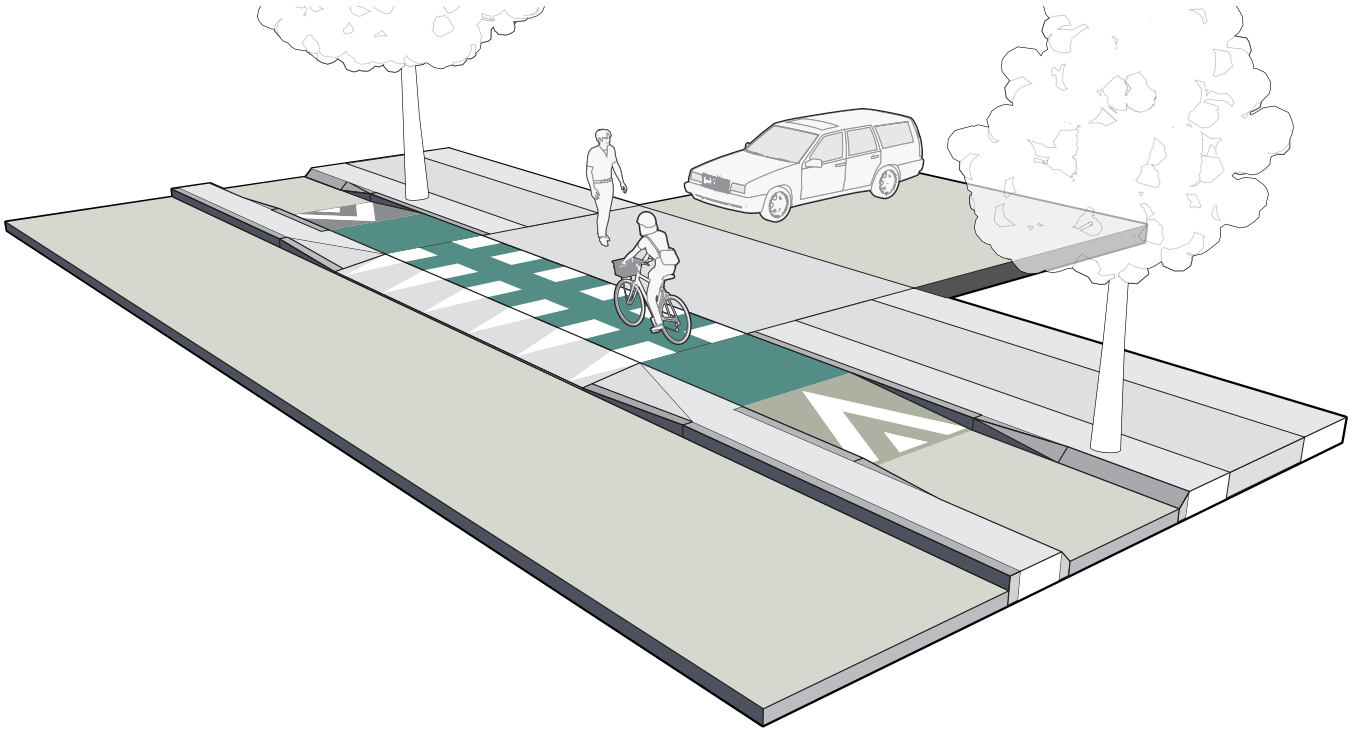
Manual on Uniform Traffic Control Devices. 2009.

City of Minneapolis Public Works

FHWA Memorandum – Interim Approval for Optional Use of Green Colored Pavement for Bike Lane. 2011.

DRIVEWAYS

Most bicycle facilities will need to cross streets, driveways, or alleys at multiple locations along a corridor. At these locations, the crossings should be designed to 1) delineate a preferred path for people bicycling through the intersection and 2) to encourage driver yielding behavior, where applicable. Bicycle crossings may be supplemented with green pavement, yield lines, and/or regulatory signs.



CONSIDERATIONS

- Supplemental yield lines, otherwise known as shark's teeth, can be used to indicate priority for people bicycling and may be used in advance of unsignalized crossings at driveways, at signalized intersections where motorists may turn across a bicycle crossing during a concurrent phase, and in advance of bicycle crossings located within roundabouts.
- Raised bicycle crossings further promote driver yielding behavior by slowing their speed before the crossing and increasing visibility of people bicycling.

GUIDANCE

- The bicycle crossing may be bounded by 12 inch (perpendicular) by 24 inch (parallel) white pavement dashes, otherwise known as elephant's feet. Spacing for these markings should be coordinated with zebra, continental, or ladder striping of the adjacent crosswalk.
- The bicycle crossing should be a minimum of 6 feet wide for one-way travel and 10 feet wide for two-way travel, as measured from the outer edge of the elephant's feet. Bicycle lane symbol markings should be avoided in bicycle crossings. Directional arrows are preferred within two-way bicycle crossings.
- Dashed green-colored pavement may be utilized within the bicycle crossing to increase the conspicuity of the crossing where permitted conflicts occur. Green color may be desirable at crossings where concurrent vehicle crossing movements are allowed and where sightlines are constrained, or where motor vehicle turning speeds exceed 10 mph.

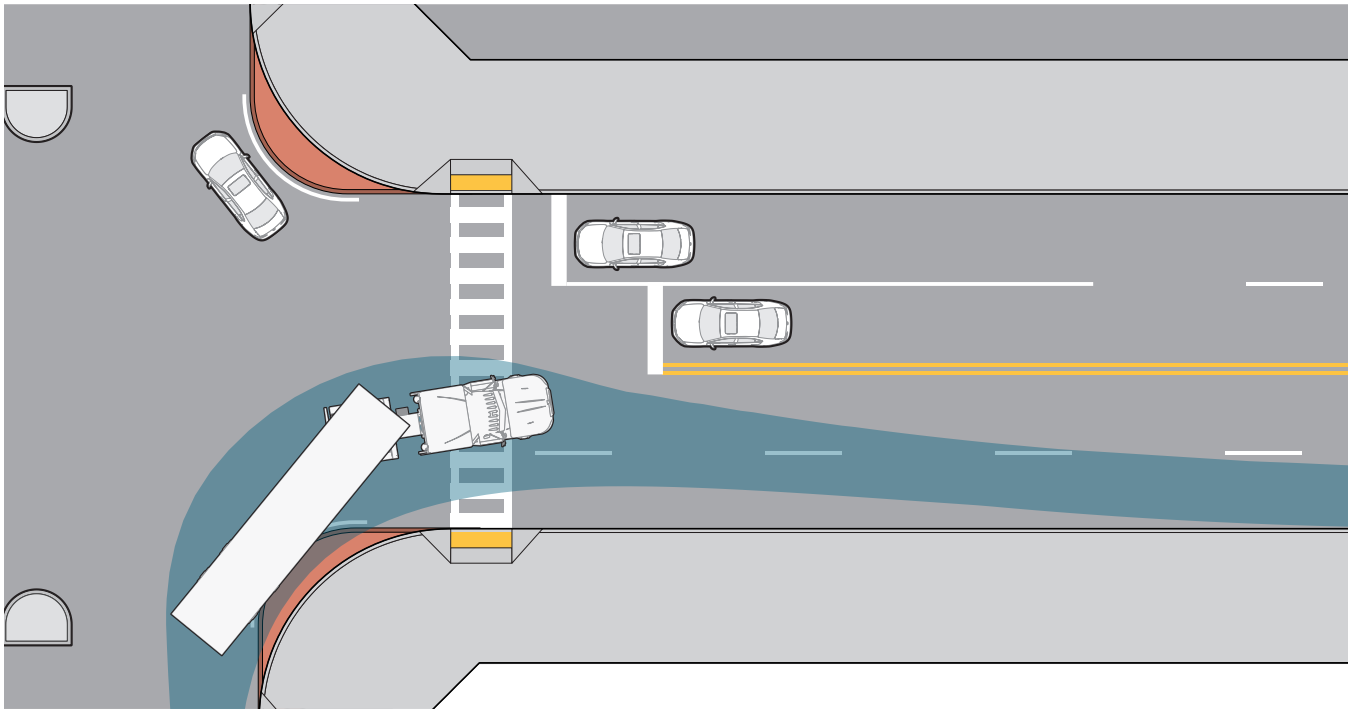
REFERENCES

MassDOT Separated Bike Lane Planning & Design Guide. 2016.

FHWA Separated Bike Lane Planning and Design Guide. 2015.

TRUCK APRONS

In locations where large vehicles make occasional turns, designers can consider mountable truck aprons. Mountable truck aprons deter passenger vehicles from making higher-speed turns, yet accommodate the occasional large vehicle without encroachment or off-tracking into pedestrian waiting areas. Mountable truck aprons should be visually distinct from the adjacent travel lane and sidewalk.



CONSIDERATIONS

Mountable truck aprons are a solution that can reduce turning speeds for passenger vehicles while accommodating the offtracking of larger vehicles where a larger corner radius is necessary.

While bicyclist and pedestrian safety is negatively impacted by wide crossings, bicyclists and pedestrians are also at risk if the curb radius is too small. Curb radii that are too small for large vehicles to navigate can result in the rear wheels of a truck tracking over queuing areas at the corner. Maintenance problems are also caused when trucks must regularly drive over street corners to make turns.

GUIDANCE

- Mountable truck aprons are part of the traveled way and as such should be designed to discourage pedestrian or bicycle refuge.
- Bicycle stop bars, detectable warning panels, traffic signal equipment and other intersection features must be located behind the mountable surface area.
- The mountable surface should be visually distinct from the adjacent travel lane, sidewalk and separated bike lane.
- The heights of mountable areas and curbs should be no more than 3 inches above the travel lane to accommodate lowboy trailers.

REFERENCES

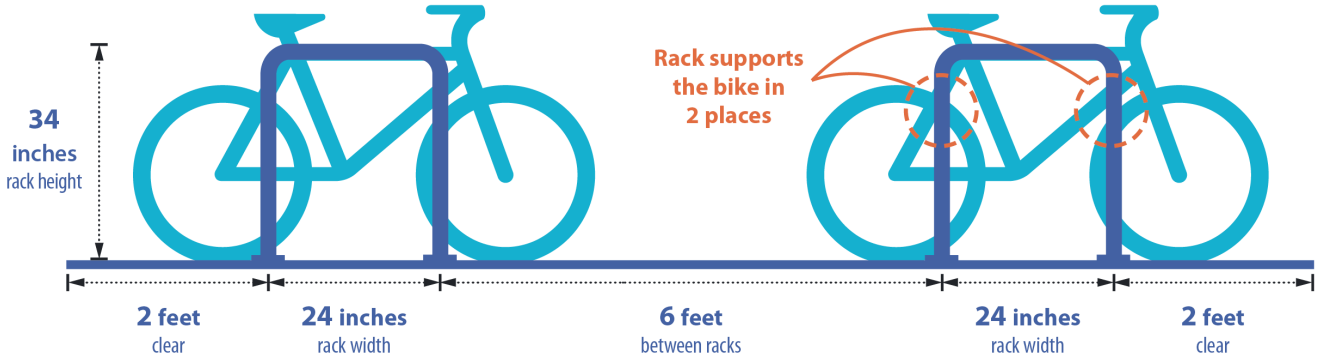
MassDOT Separated Bike Lane Planning & Design Guide. 2016.

FHWA Achieving Multi-modal Networks: Applying Design Flexibility and Reducing Conflicts. 2016.

SUPPORTIVE AMENITIES

SHORT-TERM BICYCLE PARKING

Bicycle parking enhances the effectiveness of bicycle networks by providing locations for the secure storage of bicycles during a trip. Bicycle parking enables bicyclists to secure their bicycles while patronizing businesses, recreating, and going to work. Bicycle parking requires far less space than automobile parking-- in fact, 10 bicycles can typically park in the area needed for a single car.



CONSIDERATIONS

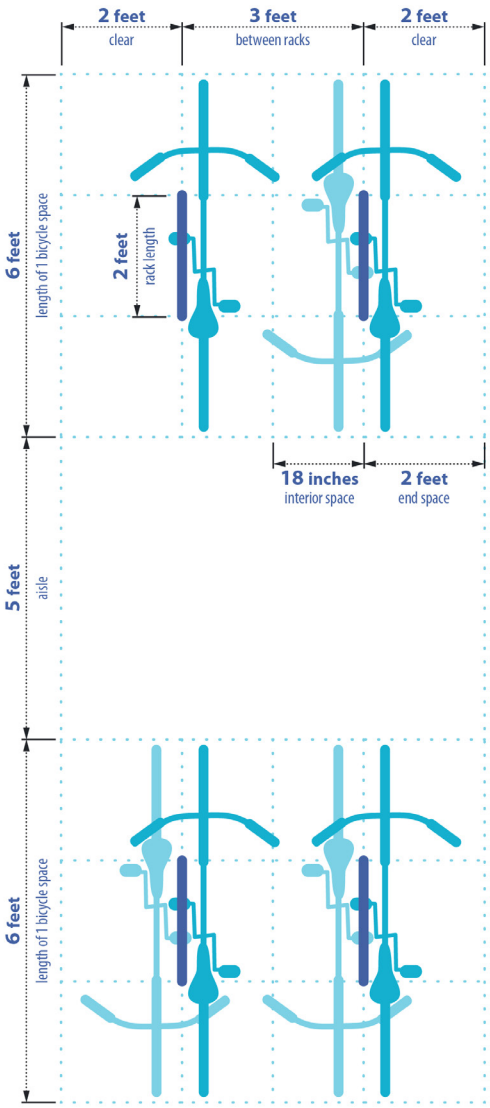
Bicycle parking consists of a rack that supports the bicycle upright and provides a secure place for locking. Bicycle racks should be permanently affixed to a paved surface. Movable bicycle racks are only appropriate for temporary use, such as at major community gatherings.

On-street bicycle parking is intended for short term use.

GUIDANCE

- Bicycle parking facility should not obstruct pedestrian traffic or interfering with the use of the pedestrian areas.
- Each parked bicycle should be accessible without moving another bicycle.
- Any sidewalk rack that is parallel to the curb should be located 2 feet from the curb face.
- Any sidewalk rack aligned perpendicular to the curb should be located so that the nearest vertical component of the rack is a minimum of 4 feet from the curb.

Two spaces per rack



REFERENCES

NACTO Urban Street Design Guide. 2013.

Manual on Uniform Traffic Control Devices. 2009.

LONG-TERM BICYCLE PARKING

Long-term bicycle parking is intended to provide sheltered and secure bicycle storage for residents, employees and long-term visitors who are leaving their bicycles in a residential or commercial building for several hours or longer and therefore need their bicycles to be protected from vandalism, theft and the elements.

CONSIDERATIONS

A bicycle locker is a secure, locked box that stores a single bicycle and provides:

- Highly secure bicycle storage in an enclosed box.
- Direct or indirect access to the street or sidewalk depending on whether it is located in a parking garage or at street level.
- Varying amount of conflict with automobiles depending on whether it is located in a parking garage or at street level.

GUIDANCE

Lockers should be:

- Clearly marked as a long-term bicycle parking space.
- Located no lower than the first complete parking level below grade, and no higher than the first complete parking level above grade.
- Available and accessible to all building tenants during the buildings hours of operation and at all times for residents in residential contexts.
- Located in a well-lit, visible location near the main entrance or elevators.
- Separated from vehicle parking by a barrier that minimizes the possibility of a parked bicycle being hit by a car.
- Securely anchored.
- Well-maintained and well lit.

REFERENCES

NACTO Urban Street Design Guide. 2013.

Manual on Uniform Traffic Control Devices. 2009.

BICYCLE ROUTING / DESTINATION WAYFINDING

Wayfinding is a highly visible way to improve bicycling in an area because it helps identify the best routes to destinations, helps people overcome a barrier of not knowing where to ride, and reminds motorists to anticipate the presence of bicyclists. A wayfinding system typically combines signage and pavement markings to guide bicyclists along preferred routes to destinations across the community, county, or region. The routes may or may not be numbered, named, or color-coded. Signs may also indicate distances or travel time to destinations. Similar wayfinding systems can be devised for pedestrian travel.

D11-1

CONSIDERATIONS

A bicycle wayfinding protocol should coordinate with bicycle route maps and provide three general forms of guidance:

- Decision assemblies, which consist of Bike Route identification and optional destination fingerboards, placed at decision points where routes intersect or on the approaches to a designated bike route.
- Turn assemblies, which consist of Bike Route panels and arrow plaques, placed where a designated bike route turns from one street to another.
- Confirmation assemblies, which consist of Bike Route panels and optional destination fingerboards, placed on the far side of intersections to confirm route choice and the distance (and optionally, time) to destinations.

Sign design can be customized to add distinct community branding, but the clarity and accuracy of the information must be the top priority.

GUIDANCE

- Basic bicycle route signs consist of a MUTCD-style "Bike Route" sign (D11-1 shown above) placed every half mile on a major bike route and on the approach to major bike routes at decision points. Unique numbered routes can be designated and can incorporate a route name or agency logos.
- Bike route signs can be supplemented with "fingerboard" panels showing destinations, directions, and distances (MUTCD D1 series).
- Place directional signs on the near side of intersections and confirmation signs on the far side of intersections.

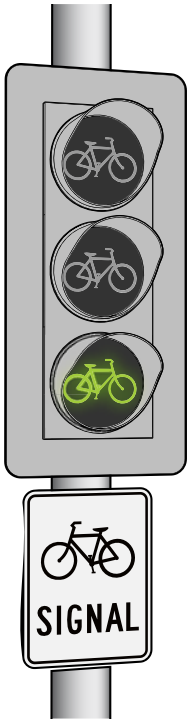
REFERENCES

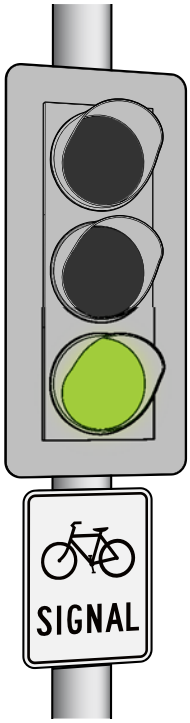
NACTO Urban Bikeway Design Guide. 2012.

Manual on Uniform Traffic Control Devices. 2009.

BICYCLE SIGNALS, DETECTION, ACTUATION

Bicyclists have unique needs at signalized intersections. Bicycle movements may be controlled by the same indications that control motor vehicle movements, by pedestrian signals, or by bicycle-specific traffic signals. The introduction of separated bike lanes creates situations that may require leading or protected phases for bicycle traffic, or place bicyclists outside the cone of vision of existing signal equipment. In these situations, provision of signals for bicycle traffic will be required.





CONSIDERATIONS

- Bicycle-specific signals may be appropriate to provide additional guidance or separate phasing for bicyclists per the 2012 AASHTO Guide for the Development of Bicycle Facilities.
- It may be desirable to install advanced bicycle detection on the intersection approach to extend the phase, or to prompt the phase and allow for continuous bicycle through movements.
- Video detection, microwave and infrared detection can be an alternate to loop detectors.
- Another strategy in signal timing is coordinating signals to provide a "green wave", such that bicycles will receive a green indication and not be required to stop. Several cities including Portland, OR and San Francisco, CA have implemented "green waves" for bicycles.

GUIDANCE

- A stationary, or "standing", cyclist entering the intersection at the beginning of the green indication can typically be accommodated by increasing the minimum green time on an approach per the 2012 AASHTO Guide for the Development of Bicycle Facilities.
- A moving, or "rolling", bicyclist approaching the intersection towards the end of the phase can typically be accommodated by increases to the red times (change and clearance intervals) per the 2012 AASHTO Guide for the Development of Bicycle Facilities.
- Set loop detectors to the highest sensitivity level possible without detecting vehicles in adjacent lanes and field check. Type D and type Q loops are preferred for detecting bicyclists.
- Install bicycle detector pavement markings and signs per the MUTCD, 2012 AASHTO Guide for the Development of Bicycle Facilities, and the NACTO Urban Bikeway Design Guide.

REFERENCES

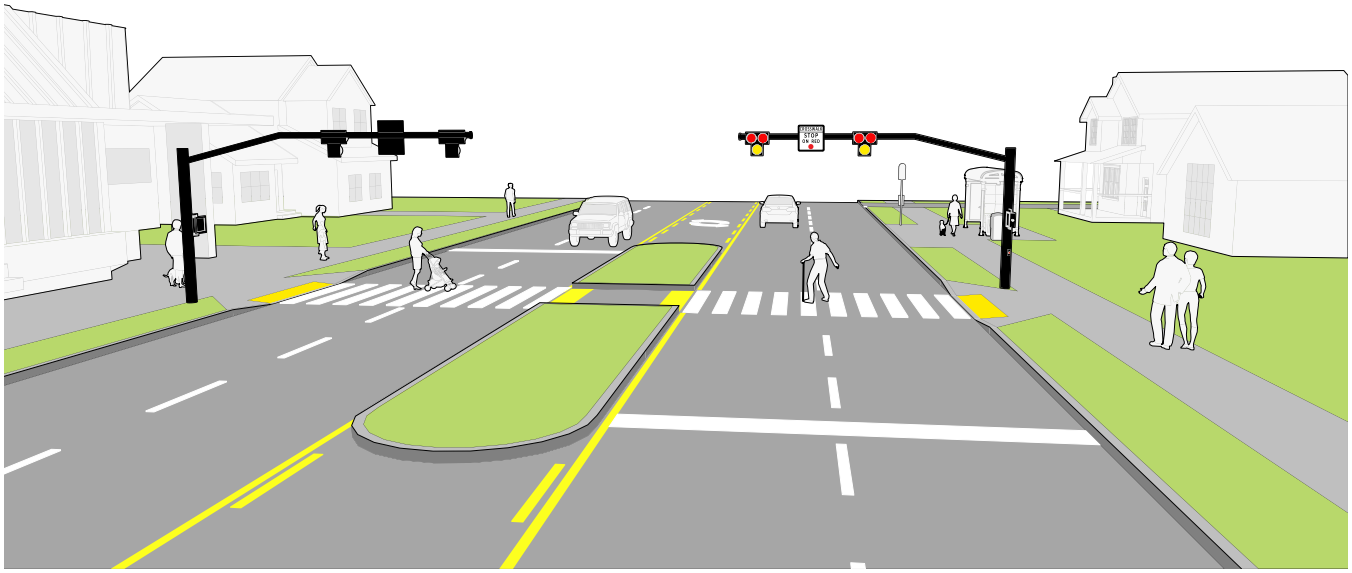
AASHTO Guide for the Development of Bicycle Facilities. 2012.

NACTO Urban Bikeway Design Guide. 2012.

Manual on Uniform Traffic Control Devices. 2009.

PEDESTRIAN HYBRID BEACON

This beacon is intended to allow pedestrians and bicyclists to stop traffic to cross high volume arterial streets. The beacon may be used in lieu of a full signal that meets any of the nine warrants in the MUTCD as well as at locations which do not meet traffic signal warrants where it is necessary to provide assistance to cross a high volume arterial.



CONSIDERATIONS

- It is recommended that this beacon be considered for all arterial crossings in the bicycle network and for trail crossings if other engineering measures prove inadequate to create safe crossings.
- Passive signal activation, such as video or infrared may also be considered.
- While this type of beacon is intended for pedestrians, it would be beneficial to retrofit the beacon as the City of Portland, Oregon has with bicycle detection and bicycle signal heads on major cycling networks to provide adequate guidance.
- Depending upon the detection design, the city may have the option to provide different clearance intervals for bicyclists and pedestrians. The provision of bicycle signal heads would require permission to experiment from FHWA.

GUIDANCE

- The MUTCD provides suggested minimum volumes of 20 pedestrians or cyclists an hour for major arterial crossings (excess of 2,000 vehicles/hour). Pushbuttons should be "hot" (respond immediately), be placed in convenient locations for bicyclists, and abide by other ADA standards.

REFERENCES

NACTO Urban Bikeway Design Guide. 2012.

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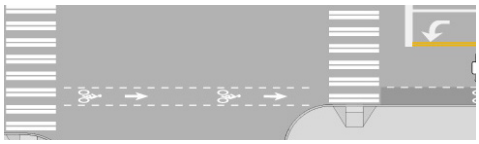
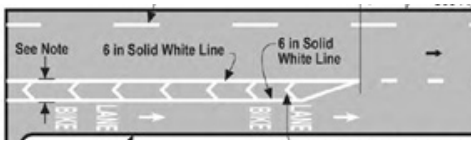
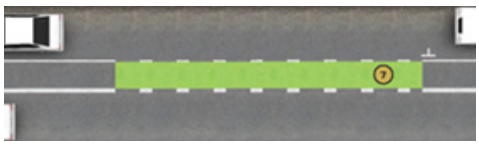
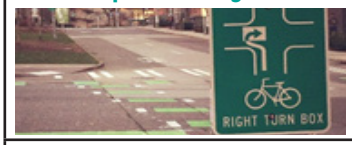
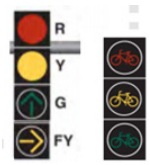
STATUS OF EXPERIMENTAL TREATMENTS

Several common traffic control devices are under experimentation or not explicitly covered in the MUTCD. The following chart shows the current status of these devices.

ITEM	Approved in FHWA MUTCD	FHWA Interim Approval Granted	Approved by NCUTCD	Approved in CA MUTCD	Projects Currently Under Experiment in CA	Requires "Request for Experimentation" from FHWA
Extended bicycle lanes through intersections 	✓			✓		
Buffer-separated bicycle lanes 	✓			✓		
Bicycle lanes on the left-hand side of one-way streets 	✓			✓		
Shared-lane markings in exclusive turn lanes 	✓					
EXCEPT bicycle plaque (R118(CA)) 			✓	✓		
Green colored bike lanes 		✓		✓		
Solid green colored bike lanes through intersections and conflict areas 		✓		✓		

ITEM	Approved in FHWA MUTCD	FHWA Interim Approval Granted	Approved by NCUTCD	Approved in CA MUTCD	Projects Currently Under Experiment in CA	Requires "Request for Experimentation" from FHWA
Dashed green colored bike lanes through 		✓		✓		
Bike signal faces for protected phases 		✓	✓	✓		
Shared-lane with green pavement background 		✓	✓		✓	✓
Bicycle box 		✓	✓		✓	✓
Two-stage turn box 		✓	✓		✓	✓
Left turn queue box sign  						✓
Flashing yellow arrow for permissive bike signal conflicts 					✓	✓
Merging vehicles yield to bikes sign 						✓
Actuated turning traffic yield to bike sign  *Photo Credit: bikeportland.org*						✓
Turning vehicles yield to bikes sign R10-15a and R10-15b 			✓			✓

Toole Design Group

Appendix E. Caltrans ATP Project Scoring Criteria

This Plan serves as a programmatic foundation for pursing grant opportunities, such as the Caltrans Active Transportation Program. The following chart provides a starting point when selecting projects to apply for grant funding.

Criteria	Description	Preliminary Resource
1. Benefit to Disadvantaged Communities	Provide a map that delineates the specific disadvantaged census tract(s) or school(s) that will benefit from the project in relationship to the project site. Scores will be scaled in relation to the severity of and the benefit provided to the disadvantaged community affected by the project.	• CalEnviroScreen[1] • Populations under the average median income • Free and Reduced Price Meal data from school districts
2. Potential for increased walking and bicycling	Potential for increased walking and bicycling, especially among students, including the identification of walking and bicycling routes to and from schools, transit facilities, community centers, employment centers, and other destinations; and including increasing and improving connectivity and mobility of non-motorized users. Applicants may describe how the project would address significant gap closures.	Chapter 3: Proposed Bicycle Network
3. Safety	Potential for reducing the number and/or rate or the risk of pedestrian and bicyclist fatalities and injuries, including the identification of safety hazards for pedestrians and bicyclists. Applicants may describe qualitative safety barriers that deter people from walking/biking if their community lacks quantitative safety data and how the project would address the community's safety concerns	Chapter 2: Existing Bicycle Network, Bicycle Safety section
4. Public Participation and Planning	Identification of the community-based public participation process that culminated in the project proposal, which may include noticed meetings and consultation with local stakeholders. Project applicants must clearly articulate how the local participation process (including the participation of disadvantaged community stakeholders) resulted in the identification and prioritization of the proposed project.	Appendix A: Public Outreach

[1] https://oehha.ca.gov/calenviroscreen

Criteria	Description	Preliminary Resource
5. Adopted Project	For projects costing $1 million or more, an emphasis will be placed on projects that are prioritized in an adopted city or county bicycle transportation plan, pursuant to Section 891.2, pedestrian plan, safe routes to school plan, active transportation plan, trail plan, or circulation element of a general plan that incorporated elements of an active transportation plan. In future funding cycles, the Commission expects to make consistency with an approved active transportation plan a requirement for large projects.	Resolution adopting the San Ramon Bicycle Master Plan (attached)
6. Public Health	Improved public health through the targeting of populations with high risk factors for obesity, physical inactivity, asthma or other health issues, with a description of the intended health benefits of the proposed project.	Chapter 1: Introduction, Vision and Goals section Chapter 4: Support Programs
7. Cost-effectiveness	A project's cost effectiveness will be evaluated on the relative costs of the project in comparison to the project's benefits as defined by the purpose and goals of the ATP. This includes the consideration of the safety and mobility benefit in relation to both the total project cost and the funds provided. The Cal-B/C benefit-cost model is being updated to incorporate active transportation projects. When this update is complete, applicants must use this model to quantify the cost-effectiveness of their project.	Chapter 5: Implementation and Funding
8. Leveraging of non-ATP funds	Leveraging of non-ATP funds (excluding in-kind contributions) on the ATP project scope proposed.	Chapter 5: Implementation and Funding
9. California Conservation Corps	Use of the California Conservation Corps or a qualified community conservation corps, as defined in Section 14507.5 of the Public Resources Code, as partners to undertake or construct applicable projects in accordance with Section 1524 of Public Law 112-141. Points will be deducted if an applicant does not seek corps participation or if an applicant intends not to utilize a corps in a project in which the corps can participate.	N/A

RESOLUTION NO. 2018-047

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAN RAMON AUTHORIZING THE CITY COUNCIL TO ADOPT THE SAN RAMON BICYCLE MASTER PLAN

WHEREAS, San Ramon's Bicycle Master Plan (BMP) will address many aspects of planning and infrastructure that affect bicycling in San Ramon; and

WHEREAS, the BMP will provide specific policy recommendations that further enhance and strengthen the goals, policies, and objectives of the City's General Plan, which sets forth a blueprint for a bikeway system in San Ramon; and

WHEREAS, by creating the first Citywide BMP, the City builds on the General Plan with an evaluation of existing conditions, and the development of a priority list of improvements that can include on- and off-street bicycle facilities; and

WHEREAS, the BMP will accomplish the following:

- Identify and prioritize the needs of cyclists
- Promote bicycling as a viable and sustainable transportation option
- Support the City's ongoing efforts to create a sustainable environment that encourages all alternative modes of transportation, consistent with the goals, strategies, and policies outlined in the General Plan
- Establish short- and long-range goals and policies intended to guide development of new facilities as well as the maintenance of existing facilities
- Provide a mechanism for the City to compete for grant opportunities outside of Contra Costa County, such as the California Active Transportation Program, and other state and federal funding programs
- Reinforce the City's importance as a regional destination by providing a bicycle network consistent with other local and regional plans
- Provide for the ongoing continuation of bicycle safety programs
- Provide recommendations to improve the overall safety of the bicyclist; and

WHEREAS, the BMP is intended to be a planning tool and general strategy plan that establishes a long-range vision for cycling in San Ramon and one that can and should evolve over time as needs change.

NOW, THEREFORE BE IT RESOLVED that the City Council of the City of San Ramon does hereby adopt the San Ramon Bicycle Master Plan.

Signatures on following page

PASSED, APPROVED, AND ADOPTED, at the meeting of April 24, 2018 by the following vote:

AYES: *Cm. Hudson, O'Loane, Perkins, Sachs, and Mayor Clarkson*

NOES:

ABSENT:

ABSTAIN:

Bill Clarkson, Mayor

ATTEST:

Renée Beck, City Clerk

Appendix F. Proposed Bicycle Network Project List

The following Proposed Bicycle Network includes the list of recommended facilities. The tables do not include existing facilities where no change is recommended. Table F.1 includes the project list with prioritization scores; prioritized scores are not included for spot improvement projects. Table F.2 includes the signage and striping projects to be implemented through the City's Pavement Management Program.

Table F.1. Prioritized Project List

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
1	**Alcosta Blvd**						13	
1A	Alcosta Blvd	Norris Canyon Road	Coyote Creek (just north of Veracruz Dr/Terra Alta Dr)	Class II bike lanes	Class IV separated bike lanes	Existing bike lane is 6'-7', depending on location. To install the Class IV separated bike lane, adjust travel lane width from 12' to 11' and construct a 2' buffer with barriers. Based on preliminary review, the removal of a travel lane to accommodate the separated bike lane should not be necessary.	17	2.02
1B	Alcosta Blvd	Coyote Creek (just north of Veracruz Dr/Terra Alta Dr)	Pine Valley Dr	Class III bike route	Class I Multi-Use Path	To install a Class I multi-use path, widen the sidewalks on either side of the street. Will require further consideration of design (e.g. one- or two-way) and feasibility. Two-way bike travel may be possible on the frontage road; if implemented, spot improvements would be needed at the intersections.	14	1.07
1C	Alcosta Blvd - Frontage Road	Thunderbird Dr	Old Ranch Rd	Class III bike route	South-bound: Class III bike boulevard; north-bound: Class IV separated bike lane	On the frontage road, adjust the travel lane to 10.5' and install a north-bound Class IV separated contra-flow bike lane adjacent to the median (5' bike lane; 2' buffer). Install wayfinding and signage for a Class III bike boulevard in the south-bound direction.	8	0.42
1D	Alcosta Blvd	Old Ranch Rd	Olympia Fields Drive	Class III bike route	Two options	Option 1: Sign the sidewalk for contraflow bicycle riders. Option 2: Submit a request to experiment with a double broken yellow line for the contraflow bike lane to the California Traffic Control Devices Committee	-	N/A

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
1E	Alcosta Blvd	Olympia Fields Dr	Fircrest Ln	Class III bike route	Class IV separated bike lanes	Option 1: Depending on parking utilization, remove parking on both sides of the street and install a 6' bike lane and 3' buffer. Option 2: Remove parking on the north side of the roadway, reduce motor vehicle lane width to 11', to provide for a two-way cycle track to Iron Horse Trail.	10	0.3
1F	Alcosta Blvd	Iron Horse Trail	Fircrest Ln	Class III bike route	North-side: Class IV separated bike lanes; South-side: Class I Multi-Use Path	Depending on parking utilization, remove parking on the north side of the street and install a Class IV separated bike lane (6' bike lane and 3' buffer). On the south side, maintain the parking to accommodate the Fairway Village Apartments and widen the sidewalk to 10' to create a Class I multi-use path.	12	0.13
1G	Alcosta Blvd	Iron Horse Trail	Belle Meade Dr	Class III bike route	Class IV separated bike lanes	Depending on parking utilization, remove parking on both sides of the street and install a 6' bike lane and 3' buffer. Install wayfinding signage to direct bicyclists to the Class III bike boulevard along Belle Meade Dr to Sand Pointe Dr to/from Interlachen Ave to Davona Dr. No bikeway facilities are recommended along Alcosta between Belle Meade Dr and Davona Dr.	13	0.27
1H	Alcosta Blvd	Davona Dr	San Ramon Valley Blvd	Class III bike route	Class IV separated bike lanes	To construct the Class IV two-way separated bike lane, remove the parking lane and widen the sidewalk on the north side. Design considerations will be needed for the intersection with the on-ramp to I-680. Install wayfinding signage to direct bicyclists to/from the Class III bike boulevard along Belle Meade Dr to Sand Pointe Dr to Interlachen Ave to Davona Dr.	14	0.31
2	**Bollinger Canyon Rd**						12	
2A	Bollinger Canyon Rd	Faria Parkway	Crow Canyon Rd	Class II	Class II bike lanes	Existing Class II bike lanes to be widened through developer improvements.	11	1.09

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
2B	Bollinger Canyon Rd	Crow Canyon Rd	Norris Canyon Rd	Class III bike route	Short-term: Sharrow markings; Mid-Term: Class II Buffered Bike Lanes; Class IV separated bike lanes	Short-term: Add sharrow markings. Mid-Term: To create a Class II buffered bike lane, narrow the median and install a 6' bike lane and 3' buffer. Long-term: Install a Class IV separated bike lane (further analysis needed).	16	0.98
2C	Bollinger Canyon Rd	Norris Canyon Rd	San Ramon Valley Blvd	Class II bike lanes	Class IV separated bike lanes	To install a Class IV separated bike lane, adjust the travel lane width from 12' to 11', and adjust the bike lane width from 8' to 6', and add a 3' separated buffer.	14	0.96
2D	Bollinger Canyon Rd	San Ramon Valley Blvd	680 NB Ramps	Shared on sidewalk with pedestrian	Class I Multi-Use Path	To install a Class I multi-use path, coordination is needed with property owners to the south. Recommendation is to keep bicyclists on the south side of Bollinger Canyon Road from San Ramon Valley Blvd to Sunset Drive where the sidewalk is currently. Sunset Drive is a better, lower-stress location to transition bicyclists from one side of the street to the other than the I-680 ramps. Design consideration is needed to route west-bound bicyclists to the north side.	13	0.15
2E	Bollinger Canyon Rd	Bollinger Canyon Rd	San Ramon Valley Blvd	Class II bike lanes	Spot improvement	Short-Term: In north/southbound direction, adjust bicycle approaches to provide dedicated space for bicyclists, separate from motor vehicles. Install painted conflict markings. Long-Term: Install a protected intersection; will require additional study.	9	N/A
2F	Bollinger Canyon Rd	680 NB Ramps	Alcosta Blvd	Shared on sidewalk with pedestrian	Class I Multi-Use Path	Widen sidewalk on the south side of Bollinger Canyon Road to a minimum of 10' (12' recommended); requires right-of-way acquisition from the property owner(s) to the south. Continue wayfinding signage along this segment to intersection with Alcosta Blvd.	13	0.85

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
2G	Bollinger Canyon Rd	Alcosta Blvd	Canyon Lakes Dr	Shared on sidewalk with pedestrian	Class I Multi-Use Path	Widen the existing multi-use path to accommodate two-way travel; requires right-of-way acquisition from the property owner(s) to the south. Assess the feasibility of a bicycle connection along the Homeowners Association Path in the neighborhood south of Bollinger Canyon Rd.	13	0.51
2H	Bollinger Canyon Rd	Canyon Lakes Dr	Dougherty Rd (north)	Class II bike lanes	Short-term: Class II Buffered Bike Lanes; Long-term: Class IV separated bike lanes	Short-term: City has plans to decrease lane width as a part of future pavement rehab projects and add painted buffers. Long-term: Add permanent barriers to create a Class IV separated bike lane.	12	1.2
2I	Bollinger Canyon Rd	Dougherty Rd (north)	Dougherty Rd (south)	Class II bike lanes	Short-term: Class II Buffered bike lane; Long-term: Class IV separated bike lanes	Short-term: Install a Class II buffered bike lane through pavement rehab. Long-term: Add permanent barriers create a Class IV separated bike lane (narrowing lanes to 11' would provide space for a Class IV separated bike lane with a 6' wide lane with 3' buffer).	15	2.74
2J	Bollinger Canyon Rd	Bollinger Canyon Road	East Branch Parkway	Class II bike lanes	Spot Improvement	Short-Term: In the westbound direction, adjust bicycle approaches to provide dedicated space for bicyclists, separate from motor vehicles. Install painted conflict markings. Install a bike box and a two-stage crossing to facilitate left turning bicycle movements from E Branch Pkwy through the intersection. In the north/southbound directions, install painted conflict markings through intersection. Long-Term: Install a protected intersection; will require additional study.	8	N/A

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
2H	Bollinger Canyon Rd	Bollinger Canyon Road	Alcosta Blvd	Class II bike lanes	Spot Improvement	Short-Term: In the southbound direction, install painted conflict markings. In the northbound direction, adjust bicycle approaches to provide dedicated space for bicyclists, separate from motor vehicles. Install painted conflict markings. In the eastbound direction, prior to the intersection, install signage directing bicyclists to the multi-use path. Long-Term: Install a protected intersection; will require additional study.	-	N/A
2J	Bollinger Canyon Rd	Bollinger Canyon Road	Dougherty Rd (north)	Class II bike lanes	Spot Improvement	Short-Term: Install painted conflict markings in the west/east bound and north/southbound directions. Long-Term: Install a protected intersection; will require additional study.	-	N/A
2N	Bollinger Canyon Rd	Bollinger Canyon Road	Dougherty Rd (south)	Class II bike lanes	Spot Improvement	Short-Term: In the south- and eastbound directions, adjust bicycle approaches to provide dedicated space for bicyclists, separate from motor vehicles. Install painted conflict markings. Install a bike box and a two-stage crossing to facilitate left turning bicycle movements from eastbound Dougherty Road through the intersection.	-	N/A
2O	Bollinger Canyon Rd	Bollinger Canyon Road	Canyon Lakes Dr	Class II bike lanes	Spot Improvement	Short-Term: Install a bike box and a two-stage crossing to facilitate left turning bicycle movements from Canyon Lakes Dr through the intersection. Install a bike box and a two-stage crossing to facilitate left turning bicycle movements from Bollinger Canyon through the intersection to the multi-use path. Long-Term: Install a protected intersection; will require additional study.	-	N/A
3	**Broadmoor Dr**						7	
3A	Broadmoor Dr	Belle Meade Dr	Alcosta Blvd	Class III bike route	Class III Bike Boulevard	Install signage/markings to create a Class III Bike Boulevard.	5	0.19
3B	Broadmoor Dr	Montevideo Dr	Belle Meade Dr	Class III bike route	Class III Bike Boulevard	Install signage/markings and implement traffic calming measures to create a Class III Bike Boulevard.	8	1.89

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
4	**Crow Canyon Rd**						8	
4A	Crow Canyon Rd	Tahiti Dr	Canyon Crest Dr	Class II bike lanes	Short-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Short-term: Create a Class II buffered bike lane by installing a 6’ bike lane with 2' painted buffer. Medium-term: Add soft-tip posts to buffer. Long-term: Install barriers to create Class IV separated bike lanes.	8	0.96
4B	Crow Canyon Rd	Canyon Crest Dr	Dougherty Rd	Class II bike lanes	Short-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Short-term: As a part of the road widening project, install a 6’ bike lane with 2' painted buffer. Medium-term: Add soft-tip posts to buffer. Long-term: Install barriers to create Class IV separated bike lanes.	8	1.41
4C	Crow Canyon Rd	Bollinger Canyon Rd	Tahiti Dr/El Capitan Dr	N/A	Mid-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Mid-term: Install a Class II buffered bike lane by providing a 6’ bike lane with 2' painted buffer; would require lane removal. Medium-term: Add soft-tip posts to buffers. Long-term: Install barriers to create Class IV separated bike lanes. Will require right-of-way acquisition and/or moving curb lines.	7	1.84
5	**Deerwood Rd**						10	
5A	Deerwood Rd	Crow Canyon Rd	Deerwood Dr	N/A	Class II bike lanes	Adjust lanes from 12' to 11' and install bike lanes in both directions. Restriping can be done with paving projects.	9	0.08
5B	Deerwood Rd	Deerwood Dr	San Ramon Valley Blvd	Class II bike lanes	Class II Buffered Bike Lane	Adjust lane width from 12' to 11' lanes to provide width for 2' buffers and 7' bike lanes. Restriping can be done with paving projects.	10	0.75
6	**Dougherty Rd**						12	
6A	Dougherty Rd	Crow Canyon Rd	Bollinger Canyon Rd	Class II bike lanes	Short-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Short-term: Install Class II buffered bike lanes by constructing a 7' bike lane and 3' painted buffers; restriping can be done with paving projects. Long-term: Install barriers to create a Class IV separated bike lane.	12	1.1

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
6B	Dougherty Rd	Bollinger Canyon Rd	Old Ranch Rd	Class II bike lanes	Short-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Short-term: Install Class II buffered bike lanes by constructing a 7' bike lane and 3' painted buffers; restriping can be done with paving projects. Long-term: Install barriers to create a Class IV separated bike lane.	12	0.61
6C	Dougherty Rd	Bollinger Canyon Rd	Bollinger Canyon Rd	Class II bike lanes	Short-term: Class II Buffered Bike Lane; Long-term: Class IV separated bike lanes	Short-term: Reduce travel lane width from 12' to 11' to provide 3' painted buffers and 7' bike lane. Long-term: Install barriers to create a Class IV separated bike lane.	-	2
7	**Bishop Dr**						0	
7A	Bishop Dr	Sunset Dr	Camino Ramon	N/A	Class I Multi-Use Path	Class I multi-use path is being constructed.	0	0.16
7B	Bishop Dr	Camino Ramon	Iron Horse Trail	N/A	Class I Multi-Use Path	Class I multi-use path is being constructed.	0	0.05
7C	Bishop Dr	N/A	N/A	N/A	Painted conflict markings	Conflict markings to be painted at 11 conflict zones on Bishop Drive. The average length of the conflict zone is 150 feet.	-	N/A
8	**Camino Ramon**						7	
8	Camino Ramon	Norris Canyon Rd	Bollinger Canyon Rd	N/A	Option 1: Class II Bike Lane; Option 2: Class I Multi-Use Path	Option 1: Remove one travel lane in each direction to provide width for Class II bike lane; future traffic study is required. Option 2: Widen sidewalks to a minimum of 10' (12' recommended) to create a Class I multi-use path.	7	0.93
9	**Crow Canyon Pl**						8	
9	Crow Canyon Pl	Crow Canyon Rd	Fostoria Way	N/A	Class II bike lanes/buffered bike lanes	Roadway width is 62'-70' along the segment. Adjust lane widths to 10.5' and provide a 5' bike lane. Where possible, widen the bike lane and add buffer.	8	0.2
10	**Executive Pkwy**						14	
10A	Executive Pkwy	Bishop Dr	Camino Ramon	N/A	Class II Buffered bike lane	To install Class II buffered bike lanes, adjust lane width from 22' to 11' to provide width for 7' wide bike lane with 3' wide painted buffer.	14	0.44

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
10B	Executive Pkwy	Camino Ramon	Iron Horse Trail	N/A	Short-term: Class II Buffered bike lane; Long-term: Class IV separated bike lanes	Short-term: Maintain the 12' travel lane and remove one travel lane to provide width for a Class II Buffered Bike Lane; will require further analysis. May require a spot treatment for buses entering and exiting the Transit Center and motor vehicles entering the parking garage. Long-term: Provide a Class IV separated bike lane.	13	0.11
10C	Executive Pkwy	Iron Horse Trail	Alcosta Blvd	N/A	Class III Bike Boulevard	Add signage/markings on access road on north side of Iron Horse Middle School from Class I multi-use path to northern entrance to school at Alcosta Blvd. Widen path from access road to Iron Horse Trail to minimum of 10' (12' recommended). Facility is located on private property and would require action by the property owner.	0	0.22
10D	Executive Pkwy	Executive Pkwy	Camino Ramon	N/A	Spot Improvement	Short-Term: On all approaches, install painted conflict markings to connect to the proposed facilities. Long-Term: Install a protected intersection; will require additional study.	-	N/A
10E	Executive Pkwy	N/A	N/A	N/A	Painted conflict markings	Conflict markings to be painted at seven conflict zones on Executive Parkway. The average length of the conflict zone is 150 feet.	-	N/A
11	**Fostoria Way**						7	
11A	Fostoria Way	Crow Canyon Place	Iron Horse Trail	N/A	Class II Buffered Bike Lane	To install a Class II buffered bike lane, remove of one travel lane in each direction; needs further analysis. Planned Class III shared route in the San Ramon General Plan 2035.	7	0.327
11B	Fostoria Way	Fostoria Way	Camino Ramon	N/A	Spot improvement	Short-Term: On all approaches, install shared lane markings. On southbound Fostoria Lane, install lane line marking through intersection.	0	N/A
11B	Fostoria Way	Fostoria Way	Iron Horse Trail	N/A	Spot Improvement	Short-term: Align the pavement markings/crosswalk to reflect the intended crossings. Long-term: Realign the Iron Horse Trail.	-	0.05
12	**Montevideo Dr**						12	

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
12A	Montevideo Dr	Tareyton Ave	Alcosta Blvd	Class III bike route	Class III Bike Boulevard	Implement a Class III Bike Boulevard with signage/markings and traffic calming and maintain parking.	13	1.24
12B	Montevideo Dr	San Ramon Valley Blvd	Tareyton Ave	Class III bike route	Spot Improvement	Add sharrows in the right-turn lane with intersection design improvements for accessing the two-way path on the west side of San Ramon Valley Blvd.	11	0.069
13	**Norris Canyon Rd**						8	
13A	Norris Canyon Rd	City Limits	Bollinger Canyon Rd	Bike Lanes (do not meet minimum standards)	Class II Bike Lane	Existing bike lanes do not meet Caltrans' minimum standards; to meet standards, narrow travel lanes to 10' and widen to bike lanes to 5'. Requires further study to evaluate roadway geometry and speeds.	7	0.41
13B	Norris Canyon Rd	Bollinger Canyon Rd	Twin Creeks Dr	Class III bike route	Class III Bike Boulevard	Implement a Class III Bike Boulevard with signage/markings and traffic calming and maintain parking.	0	0.54
13C	Norris Canyon Rd	Twin Creeks Dr	Alcosta Blvd	Class II bike lanes	Short-term: Class II Buffered Bike Lanes; Long-term: Class IV separated bike lanes	Short-Term/Underway: City is adjusting the lane widths with paving projects and adding a Class II buffered bike lane. Long-term: Add barriers to create a Class IV separated bike lane.	12	0.98
13D	Norris Canyon Rd	Iron Horse Trail	N/A	N/A	Spot Improvement	Short-term: Realign the Iron Horse Trail on either side of Norris Canyon Road to align with the crosswalk.	6	0.05
13E	Norris Canyon Rd	N/A	N/A	N/A	Painted conflict markings	Conflict markings to be painted at 13 conflict zones on Norris Canyon Road. The average length of the conflict zone is 150 feet.	-	N/A
13F	Norris Canyon Rd	Camino Ramon	N/A	N/A	Spot Improvement	Consider options to improve intersection such as a bike box, two-stage turn, conflict markings, or protected intersection.	-	N/A
14	**Old Ranch Rd**						10	

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
14	Old Ranch Rd	Alcosta Blvd	Dougherty Rd	N/A	Option 1: Class IV separated bike lanes; Option 2: Class I Multi-Use Path	Option 1: Install Class IV separated bike lanes; would require removal of one travel lane in each direction to provide space for buffer and bike lane. Option 2: Implement a Class I Multi-use path; would require widening sidewalk to a minimum of 10' (12' recommended). Widening sidewalk may require retaining walls in some areas. Both options need further analysis.	10	0.84
15	**San Ramon Valley Blvd**						11	
15A	San Ramon Valley Blvd	Deerwood Rd (Northern City Limit)	Montevideo Dr	Class II bike lanes	Class IV separated bike lanes	To install a Class IV separated bike lane, adjust lane width from 12' to 11' to provide width for 2-3' buffer and 6-8' bike lanes. Needs further analysis.	9	2.79
15B	San Ramon Valley Blvd	San Ramon Valley Blvd	Deerwood Dr	N/A	Spot Improvement	Short-Term: Install painted conflict markings on all approaches. Long-Term: Install a protected intersection; will need additional study.	-	N/A
15C	San Ramon Valley Blvd	Crow Canyon Rd	N/A	Class II bike lanes	Spot improvement	Short-Term: Install painted conflict markings in the north/southbound directions. Long-Term: Install a protected intersection; will require additional study.	-	N/A
15D	San Ramon Valley Blvd	Norris Canyon Rd	N/A	Class II bike lanes	Spot improvement	Short-Term: In north/southbound direction, adjust bicycle approaches to provide dedicated space for bicyclists, separate from motor vehicles. Install painted conflict markings. In east/westbound direction, install painted conflict markings to connect to existing and proposed facilities. Long-Term: Install a protected intersection; will require additional study.	-	N/A
15E	San Ramon Valley Blvd	Montevideo Dr	Westside Dr	Class II bike lanes	Option 1: Class I Multi-use path; Option 2: Class IV separated bike lanes	Option 1: Construct a Class I multi-use path to facilitate bicycle movement from Westside Dr north to Montevideo Dr. Option 2: Install a Class IV separated bike lane by adjusting the lane width from 12' to 11' to provide width for 2-3' buffer and 6-8' bike lanes. Needs further analysis.	11	0.14

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
15F	San Ramon Valley Blvd	Westside Dr	Alcosta Blvd (Southern City Limit)	Class II bike lanes	Class IV separated bike lanes	Adjust lane width from 12' to 11' to provide width for 2-3' buffer and 6-8' bike lanes.	13	1.73
16	**Village Pkwy**						10	
16A	Village Pkwy	Alcosta Blvd	Triana Way	Class II bike lanes	Class II Buffered Bike Lanes	Add striping for a 2' buffer and 7' bike lanes - will connect to Class II buffered bike lanes in the City of Dublin. Restriping can be achieved through paving projects.	10	0.18
16B	Village Pkwy	Triana Way	Southern City Limit	Class II bike lanes	Class II Buffered Bike Lanes	Adjust lane widths from 12' to 11' and add striping for a 2' buffer and a 5' bike lane - will connect to Class II buffered bike lanes in the City of Dublin. Restriping can be achieved through paving projects.	0	0.09
	See Table F.2 for Projects 17-29							
	Additional Projects							
30	Overcrossing	Bollinger Canyon Road	Iron Horse Trail	N/A	Overcrossing	In progress - the installation of a bicycle and pedestrian overcrossing over Bollinger Canyon Road.	6	N/A
31	Overcrossing	Crow Canyon Road	Iron Horse Trail	N/A	Short-term: Spot Improvement; Long-term: Overcrossing	In progress - the installation of a bicycle and pedestrian overcrossing over Crow Canyon Road. Interim spot improvement needed, prior to installation of overcrossing.	6	N/A
32	Planned Bike Path	Old Dougherty Rd	Dougherty Rd	N/A	Class I Multi-Use Path	Connects the Old Dougherty Road multi-use path to Dougherty Road and Bella Vista Elementary School; identified in the San Ramon General Plan 2035.	4	0.26
33	West side of Parking Lot at Diablo Valley College San Ramon Campus	Watermill Rd	Bollinger Canyon Rd	N/A	Class I Multi-Use Path	Extend the existing multi-use path on Watermill Road to the west side of Bollinger Canyon Road. Option to connect multi-use path to the existing path on the east side of Bollinger Canyon Road; may require a cut-through in the median and enhanced crossing treatments.	16	0.26
34	Faria Preserve Pkwy	Bollinger Canyon Road	Omega Road	N/A	Class II Buffered Bike Lane	This project is identified in the San Ramon General Plan 2035; provide wayfinding on Purdue Road to the bike path.	0	1.21

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
35	Old Dougherty Rd Multi-Use Path	Ivy Leaf Springs Rd	Bollinger Canyon Rd	N/A	Class I Multi-Use Path	In progress - This project is identified in the San Ramon General Plan 2035.	0	0.75
36	Inverness Park near Ascot Drive	Broadmoor Dr	Main Price Ct; Fryer Ct; Moore Ct; and Ascot Dr	Sidewalks	Class I Multi-Use Path	Install a Class I multi-use path to enhance east/west connectivity through park.	15	0.5
37	St. Denis Dr	Broadmoor Dr	Iron Horse Trail	N/A	Class I Multi-Use Path	Formalize trail along northern border of high school by adding a multi-use path with a minimum width of 10' (12' recommended)	16	0.2
38	Trail across from La Copita	Twin Creeks Dr	Shopping Center	Existing trail	Class I Multi-Use Path	Widen trail to a minimum of 10' (12' recommended); install curb ramp onto Twin Creeks Drive; remove bollard.	13	0.22
39A	Cross Valley Trail	Del Mar Dr	Alcosta Blvd	Gravel trail	Class I Multi-Use Path	Extend the existing Cross Valley Trail from its current terminus on Del Mar Dr to Alcosta Blvd. Facility is located on private property and would require action by the property owner.		0.51
39B	Cross Valley Trail	Alcosta Blvd	Dougherty Road	Gravel trail	Class I Multi-Use Path	This trail would require further analysis. An existing trail is located here; however, given the steep topography, the proposed bikeway would have approximately 10% grades on average, on both the east side and west side of the ridge. To mitigate the effects of the grade, it would be necessary to either provide flat rest areas at 200-foot intervals along the bikeway, or provide additional switchbacks along the route to reduce the grade required for the route. In addition to providing switchbacks or resting areas, the proposed route would need to be analyzed in more detail to ensure that the proposed geometry is suitable for the higher speeds associated with long grades. It may be necessary to provide more gentle curves, and forgiving roadsides, to lessen the probability or severity of run-off-the-road bike crashes.	12	1.08
40	Trail connected to Bollinger Canyon	Norris Canyon Rd	Bollinger Canyon Elementary School	Existing trail	Class I Multi-Use Path	Widen trail to a minimum of 10' (12' recommended) and install curb ramp onto Norris Canyon Road.	14	0.65

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Prioritization Score	Approximate Mileage
	Elementary school							
41	Painted conflict markings in Bishop Ranch development	N/A	N/A	N/A	Green painted conflict zones	Install green painted conflict zoning markings in the Bishop Ranch development on Sunset Drive, Annabel Lane, and Camino Ramon.	-	N/A
42	Trail	Canyon Lakes Dr	Woodland Dr	Existing trail	Class I Multi - Use Path	Work with property owner to develop bicycle and pedestrian connection. Will require additional study.	-	0.13

Pavement Management Program Projects

The following projects are comprised mainly of signage and striping projects; these will be implemented as a part of the City's Pavement Management Program. All projects in Table F.2 received a prioritization score of zero because these will be implemented through an existing program.

Table F.2. Pavement Management Program Projects

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Approximate Mileage
17	**Canyon Creek/Dos Rios Bike Boulevard**						
17A	Canyon Creek Dr	Shopping Center	Dos Rios Dr	N/A	Class III Bike Boulevard	Add signage/markings and enhance existing traffic calming measures	0.36
17B	Dos Rios Dr	Bollinger Canyon Rd	Canyon Creek Drive	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.39
18	**Hawkins/Morgan/Wildhorse Bike Boulevard**						
18A	Hawkins Dr	Corey Pl	Morgan Dr	N/A	Class III Bike Boulevard	Add sign/markings and traffic calming measures. Intersection improvements recommended, including installing an activated bike crossing and median refuge, and widening the shoulder - Needs further analysis.	0.3
18B	Morgan Dr	Hawkins Dr	Wildhorse Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures. Possible treatment: add climbing lanes in the uphill direction. If add speed bumps, place channels in the speed bumps for bicycle passage and sign 15 or 20mph.	0.95
18C	Wildhorse Drive	Morgan Dr	Paddock Dr	N/A	Class III Bike Boulevard	Add signage/markings	0.59
18D	Paddock Dr	Wildhorse Dr	Bollinger Canyon Rd	N/A	Class III Bike Boulevard	Add signage/markings	0.05
19	**Marsh Dr Bike Boulevard**						
19A	Marsh Dr	Aranda Dr/Bollinger Canyon Rd	Bollinger Canyon Rd	N/A	Class III Bike Boulevard	Add signage/markings.	1.11
19B	Rosario Court	Marsh Dr	Trail	N/A	Class III Bike Boulevard	Add signage/markings.	0.13
20	**Twin Creeks/Santander/Talavera Bike Boulevard**						

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Approximate Mileage
20A	Twin Creeks Drive	Crow Canyon Rd	Norris Canyon Rd	N/A	Class III Bike Boulevard	Add signage/markings. Additional analysis is needed to determine whether vehicle speeds and volumes are appropriate for a Class III bike boulevard. If speeds and volumes are higher than recommended for signage/markings only, traffic calming measures should be implemented.	0.41
20B	Twin Creeks Drive	Norris Canyon Rd	Castleton Ct	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.15
20C	Castleton Ct	Cuenca Drive	Twin Creeks Dr	N/A	Class III Bike Boulevard	Add signage/marking and traffic calming measures	0.04
20D	Cuenca Dr	Santander Dr	Castleton Ct	N/A	Class III Bike Boulevard	Add signage/markings	0.13
20E	Santander Dr	Mesa Vista Dr	Talavera Dr	N/A	Class III Bike Boulevard	Add signage/markings	0.59
20F	Mesa Vista Dr	Marsh Dr	Santander Dr	N/A	Class III Bike Boulevard	Add signage/markings	0.09
20G	Talavera Drive	Santander Dr	Bollinger Canyon Rd	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.39
21	**Belle Meade Dr/Sand Point Dr/Interlachen Ave**						
21A	Belle Meade Dr	Alcosta Blvd	Sand Point Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.07
21B	Sand Point Dr	Belle Meade Dr	Interlachen Ave	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.07
21C	Interlachen Ave	Sand Point Dr	Davona Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.35
22	**Blue Mound Dr/Burning Tree Dr/Thunderbird Dr/Olympia Fields Dr**						
22A	Blue Mound Dr	Pine Valley Rd	Burning Tree Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.28
22B	Burning Tree Dr	Blue Mound Dr	Thunderbird Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.11
22C	Thunderbird Dr	Olympia Fields Dr	Alcosta Blvd	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.23
22D	Olympia Fields Dr	Thunderbird Dr	Alcosta Blvd	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.46
	Other Bike Boulevards						

Project Number	Location	Cross Street X	Cross Street Y	Existing Bike Facility	Proposed Bike Facility	Proposed Facility Details	Approximate Mileage
23	Blue Fox Way	Davona Dr	Northland Ave	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.28
24	Creekside Dr	Bollinger Canyon Rd	Park Pl	N/A	Class III Bike Boulevard	Add signage/markings. Facility is located on private property and would require action by the property owner.	0.31
25	Davona Dr	Montevideo Dr	Alcosta Blvd	N/A	Class III Bike Boulevard	Implement traffic calming; maintain the parking lines.	2.02
26	Dunbarton Cir	Broadmoor Dr	Iron Horse Trail access trail at north entrance to Montevideo Elementary School	N/A	Class III bike Boulevard	Add signage/markings and traffic calming measures; enhance the crosswalk at the Iron Horse Trail; consider realignment of trail crossing to minimize conflicts with vehicles in the school driveway.	0.16
27	Northland Ave	Davona Dr	Broadmoor Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.43
28	St. Denis Dr	Davona Dr	Broadmoor Dr	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.35
29	Trumpet Vine Lane	Trefoil Rd	Hibiscus Ln	N/A	Class III Bike Boulevard	Add signage/markings and traffic calming measures	0.29