Berkeley SafeTREC

SAFE TRANSPORTATION RESEARCH AND EDUCATION CENTER

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CITY OF MILL VALLEY / COUNTY OF MARIN

COMPLETE STREETS SAFETY ASSESSMENT

Issues, Opportunities, and Suggested Strategies

Assessment Team

Afsaneh Yavari, T.E.
John Ciccarelli

October 2022

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FINAL REPORT

OCTOBER 2022

ASSESSMENT TEAM

Afsaneh Yavari, T.E.
University of California Berkeley
Safe Transportation Research and
Education Center (SafeTREC)
Berkeley, CA 94720
afsaneh.yavari@berkeley.edu

John Ciccarelli
Bicycle Solutions
511 Anderson St
San Francisco, CA 94110
(415) 912-6999
johnc@bicyclesolutions.com
www.bicyclesolutions.com

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EXECUTIVE SUMMARY

The County of Marin requested that SafeTREC at the University of California, Berkeley conduct a Complete Streets Safety Assessment (CSSA) for an area that spans within two jurisdictions, City of Mill Valley, and unincorporated County of Marin. One SafeTREC safety expert conducted the CSSA. He visited the City of Mill Valley and the unincorporated area of Marin County and conducted an audit on March 08, 2022. The objectives of the CSSA are to improve motorist, pedestrian, and bicycle safety and to enhance accessibility for all road users.

This report is organized into the following chapters:

- Chapter 1 is an introduction to the Complete Streets Safety Assessment for Marin County and City of Mill Valley.
- Chapter 2 presents background information on bicyclist and pedestrian crash history in the County and the City.
- Chapter 3 presents benchmarking analysis results and suggestions for potential improvement from the benchmarking analysis.
- Chapter 4 presents field walking audit results and suggestions for potential improvements from the audit.

Benchmarking Analysis of Policies, Programs, and Practices

To assess pedestrian safety conditions in Marin County, the expert team conducted a benchmarking analysis to understand how the County's existing conditions compared with current national best practices. Through a pedestrian and bicycle safety assessment survey conducted with County staff, the expert team identified the County's pedestrian and bicycle policies, programs, and practices and categorized them into three groups:

- Key strengths (areas where the County is exceeding national best practices)
- Enhancement areas (areas where the County is meeting national best practices)
- Opportunity areas (areas where the County appears not to meet national best practices)

The benchmarking analysis aims to provide the City/County with information on current best practices and how the City/County compares. While suggestions are provided for each category, cities and counties have differing physical, demographic, and institutional characteristics that may make certain goals or policies more appropriate in some jurisdictions than others. Ultimately, County or City staff may determine where resources and efforts are best placed for meeting local development and infrastructure goals for pedestrians and bicyclists.

A discussion of the County's pedestrian and bicycle safety policies, programs, and practices, and suggestions for potential improvement or further enhancement to the County's existing programs and policies are presented in Chapter 3.

Walking Audit Focal Areas

The County staff had expressed their concern about the Montford / Molino / Edgewood (Avenues) / Sequoia Valley (Road) corridor, as indicated in their CSSA application:

"Montford / Molino / Edgewood (Avenues) / Sequoia Valley (Road) is a popular cycling route leading to Mount Tamalpais State Park and Muir Woods National Monument that spans two jurisdictions, City of Mill Valley and unincorporated County of Marin. It's a narrow, double-yellow two-lane road without a continuous dedicated shoulder or bike lane, lined with driveways accessing local residences. Conflicts occur between uphill bicycle riders and vehicles, resulting in passing. Members of the public have raised concerns regarding passing of bicycles by vehicles, particularly on curves where there are limited sight lines for oncoming traffic… The roadway also provides access to Muir Woods National Monument, which receives nearly 1 million visitors each year."

After the initial conference call between SafeTREC staff and the City and County Staff on November 30, 2021, the following nine focus areas were outlined:

1. Intersection of Montford / Molino
2. Montford - Janes alternate route segment
3. Intersection of Molino / Janes
4. Intersection of Molino / Edgewood / Cape
5. Intersection of Edgewood / Marion / Ridgewood
6. Blind curve between Douglas and Ridgewood
7. Intersection of Edgewood / Douglas
8. Intersection of Edgewood / Sequoia Valley
9. Alternate routes

Many of the strategies suggested in this report are appropriate for grant applications, including Office of Traffic Safety (OTS) or Active Transportation Program (ATP) funding. The strategies may also be incorporated into a bicycle or pedestrian master plan, documents that could set forth bicycle, pedestrian, and streetscape policies for the City/County, identify, and prioritize capital improvement projects.

The suggestions presented in this report are based on limited field observations and time spent (one day) in City of Mill Valley and unincorporated area of Marin County by the CSSA evaluator. These suggestions, which are based on general knowledge of best practices in traffic engineering and planning for motorist, pedestrian, and bicycle design and safety, are intended to only guide City/County staff in making decisions for future safety improvement projects in the City/County. These suggestions may not incorporate all factors which may be relevant to safety issues in the City/County. Since it is beyond scope of this assessment to evaluate and analyze all the suggestions received from the residents/members of the community and other stakeholders, it is suggested that the City/County staff use this report to continue their dialogue with the residents and members of the community and other stakeholders to address their concerns or suggestions in future studies. The City or County may use this report in support of engaging a traffic engineering firm to conduct a detailed comprehensive analysis of this corridor.

1. INTRODUCTION

1.1. OBJECTIVE OF THE ASSESSMENT

The City of Mill Valley (City) and County of Marin (County) requested that the Safe Transportation Research and Education Center (SafeTREC) at University of California, Berkeley conduct a Complete Streets Safety Assessment (CSSA) for a corridor within the City and the unincorporated area of the County. The objective of the CSSA is to improve safety and accessibility for all people driving, walking, and bicycling in and around the study corridor. This assessment emphasizes safety and mobility issues associated with all users of the roadways.

1.2. ASSESSMENT APPROACH

The SafeTREC Safety expert conducted an initial conference call with Marin County and City of Mill Valley staff on November 30, 2021, which other stakeholders attended. The expert met with the City and County staff and conducted a driving and walking audit on March 08, 2022. Positive practices as well as pedestrian and bicycle safety and accessibility issues were identified at the audit.

1.3. ACKNOWLEDGMENTS

SafeTREC wishes to acknowledge the following City and County staff for their generous participation and providing background documents during this Assessment process:

- Carey Lando, Senior Project Planner, County of Marin
- Dan Dawson, Interim Transportation Planning Division Manager, County of Marin
- Craig Tackabery, Project Manager, City of Mill Valley

1.4. DISCLOSURES

The suggestions presented in this report are based on limited field observations and time spent (one day) in City of Mill Valley and unincorporated area of Marin County by the CSSA evaluator. These suggestions, which are based on general knowledge of best practices in traffic engineering and planning for motorist, pedestrian, and bicycle design and safety, are intended to only guide City/County staff in making decisions for future safety improvement projects in the City/County. These suggestions may not incorporate all factors which may be relevant to safety issues in the City/County. Since it is beyond scope of this assessment to evaluate and analyze all the suggestions received from the residents/members of the community and other stakeholders, it is suggested that the City/County staff use this report to continue their dialogue with the residents and members of the community and other stakeholders to address their concerns or suggestions in future studies. The City or County may use this report in support of engaging a traffic engineering firm to conduct a detailed comprehensive analysis of this corridor.

As this report is conceptual in nature, conditions may exist in the focal areas that were not observed and may not be compatible with suggestions in this report. Before finalizing and implementing any physical changes, City/County staff may conduct more detailed studies or further analysis to refine or discard the suggestions in this report if they are found to be contextually inappropriate or appear not to improve pedestrian and bicyclist safety or accessibility due to conditions including, but not limited to, high vehicular traffic volume or speeds, physical limitations on space or sight distance, or other potential safety concerns.

2. BACKGROUND AND CRASH HISTORY

The City of Mill Valley is in southern Marin County. According to Office of Traffic Safety, as of 2019, City of Mill Valley had a population of approximately 14,623, which puts it in population group E, as shown in Table 2-1.

Table 2-1: City of Mill Valley Summary Statistics

Year	County	Population	Group	Daily Vehicle Miles Traveled (VMT)
2019	Marin	14,623	E	184,110

According to Marin County's CSSA application, the unincorporated suburban hillside areas of Tamalpais Valley are estimated to house around 7,000 residents.

2.1. PEDESTRIAN AND BICYCLIST CRASH DATA

The crash data in this section is obtained from SafeTREC TIMS tool, https://tims.berkeley.edu/, the data source of which is SWITRS.

From 2016 – 2021, in the City of Mill Valley, there were no pedestrian crashes within the focus areas of this assessment. During the same time period there were two bicycle-related crashes within the focus areas of City of Mill Valley:

- Intersection of Molino Avenue and Montford Avenue, 2016, visible injuries
- Intersection of Molino Avenue and Mirabel Avenue, 2021, visible injuries

From 2016 – 2021, in the unincorporated areas of Marin County there were no pedestrian involved crashes, but there were 3 crashes that involved bicyclists within the focus areas of this assessment:

- Sequoia Valley Road at Castle Rock Drive, 2017, involving a bicyclist with visible injuries
- Sequoia Valley Road and Amaranth Blvd, 2017, involving a bicyclist with visible injuries
- Panoramic and Muir Woods Drive, 2018, involving a bicyclist with visible injuries

3. BENCHMARKING ANALYSIS RESULTS AND SUGGESTIONS

To assess pedestrian and bicycle safety conditions in Marin County, the CSSA team first conducted a benchmarking survey to understand how the Marin County's existing conditions compare to current national best practices including consistency with the Safe System approach as shown in here. Through a holistic view of first anticipating human mistakes and keeping impact energy levels on the human body at tolerable levels, the Safe System approach aims to eliminate fatal and serious injuries for all road users[1].

The Safe System Approach
Source: Fehr & Peers for FHWA

The responses provided by the County's staff to the benchmarking questionnaire were analyzed with a benchmarking matrix, as shown in Table 3-1, which lists the benchmarking topics that fall under the following categories:

- Enhancing Safety through Accessibility
- Policies and Programs
- Safety Implementation Plans and Policies
- Safety Data Collection and Assessment
- Pedestrian and Bicycle Network Planning and Design
- Pedestrian and Bicycle Support Programs

In this study the Safe System approach is promoted. The Safe System approach refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives, in contrast to the traditional road safety approach, which strives to modify human behavior and prevent all crashes. Community Pedestrian and Bicycle Safety Program (CPBSP) of SafeTREC has developed a toolkit:

https://safetrec.berkeley.edu/sites/default/files/cpbst_safesystem_toolkit_070522.pdf

The CSSA team also reviewed the County's website and relevant documents. The CSSA team identified the County's pedestrian and bicycle policies, programs, and practices and categorized these into three groups:

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

- Key strengths (areas where the County is exceeding national best practices)
- Enhancement areas (areas where the County is meeting national best practices)
- Opportunity areas (areas where the County appears not to meet national best practices)

While suggestions are provided for each category, counties and cities have differing physical, demographic, and institutional characteristics that may make certain goals or policies more appropriate in some jurisdictions than others. Ultimately, County/City staff may determine where resources and efforts are best placed for meeting local development and infrastructure goals for pedestrians and bicyclists. This analysis shares information on current national best practices and how the County compares.

Based on the County staff's responses to the questionnaire, each topic receives at least one of those three ratings, which are highlighted in green. The rows that have no highlighted cell are the ones that no response was provided for the related question on the benchmarking questionnaire. The ones that have more than one cell highlighted, all the highlighted cells could apply in County staff's response to the related question.

The items in Table 3-1 are further elaborated in the following sections, which provide a description for each benchmarking topic. The topics incorporate the Safe System elements (Safe Road Users, Safe Vehicles, Safe Speeds, Safe Roads, and Post-Crash Care) while also incorporating best practices related to access and comfort for people walking and biking. Suggestions for possible improvements and better aligning with best practice benchmarks are provided; the County could consider implementing as they determine is appropriate. Although the suggestions provided for each category is based on the responses from the County staff to the benchmarking questionnaire, they could be utilized by City of Mill Valley as appropriate.

TABLE 3-1: Summary of Programs, Policies, and Practices
Benchmarking Analysis for Marin County

Benchmark Topic	Key Strength	Enhancement	Opportunity
Enhancing Safety through Accessibility			
Safe Road Users, Safe Roads			
Implementation of Americans with Disabilities Act (ADA) Improvements	Uses state-of-the-practice (PROWAG) ADA improvements with consistent installation practices	Has clear design guidelines but no regular practices for ADA compliance	Has minimal design guidelines and practices related to ADA requirements
ADA Transition Plan for Streets and Sidewalks	Has ADA transition plan in place and an ADA coordinator	Partial or outdated ADA transition plan or an ADA coordinator	No transition plan or ADA coordinator

Benchmark Topic	Key Strength	Enhancement	Opportunity
Ensure Safety for All Users is Prioritized, and Accessibility Maintained, During Construction and Road Maintenance Projects	Has a policy in place that details how to maintain accessibility and provide designated space for people biking and walking through a Construction Management Plan (CMP) CSSA Marin County - Mill Valley Draft Report AugustJC.docx	Occasionally requires a CMP or has outdated CMP guidelines	No CMP guidelines
Policies and Programs			
Safe Road Users, Safe Roads, Safe Vehicles			
Roadway Safety Coordinator	Has a Roadway Safety Coordinator on staff who manages the agency's pedestrian and bicycle programs (e.g., Complete Streets Program and/or Vision Zero Program) and helps with capacity building of staff	Occasionally uses a part-time contract coordinator	Does not have a Roadway Safety Coordinator
Formal Advisory Committee	Has a formal, active/on-going Transportation Advisory Committee guided by a charter or mission that includes the safety of vulnerable road users and whose activities focus on improving pedestrian and bicycle safety.	Has an ad-hoc Transportation Advisory Committee or one not guided by a charter or mission that specifically includes safety of vulnerable road users. Note: Local Agency's Planning Commission may act as Transportation Advisory Committee	Does not have a Transportation Advisory Committee

Benchmark Topic	Key Strength	Enhancement	Opportunity
Equitable Community Engagement Strategy that Includes Community Based Organization (CBO) Involvement	Has an equity-focused public engagement strategy and, along with a local CBO, creates opportunities for public engagement on walking and biking topics through a variety of community-specific formats (e.g., venues, times of day, languages). Community engagement is an on-going process and does not only happen during the duration of the project, but also leading up to and after the project is completed (e.g., 311 app).	Has an equitable public outreach strategy, but formal community engagement events happen on a project-by project basis and/or without CBO partnerships.	Does not have a formal public involvement or feedback process for bicycle/pedestrian planning or safety
Traffic Calming or Speed Management Program	Has a speed management program that is reviewed annually alongside the CIP project list. Major arterials and neighborhood corridors include proactive speed management strategies and countermeasures are implemented to reach safe target speeds	Has a traffic calming program but funding and implementation of countermeasures are ad-hoc and reactive	Explores traffic calming features other than speed humps

Benchmark Topic	Key Strength	Enhancement	Opportunity
Speed Limit Setting	Regularly surveys speed and identifies locations with high deviation from target speeds. Agency uses best practices for speed management in combination with allowances from AB 43 to lower speed limits. Implementing lower speed limits is done using a consistent approach that prioritizes areas with historic under investment. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB43	Seeks to include 15 mph speed limits in school zones or commercial corridors.	Continues to use the 85th percentile to set speed limits.
Safe Routes to Schools	Has an ongoing Safe Routes to Schools program that is included as part of the agency's safety monitoring and is integrated with other policies and programs	Has obtained funding for recent projects, but has no community-wide Safe Routes to Schools program	Does not have a Safe Routes to Schools program and has not obtained recent funding
Systemic Signalized Intersection Enhancements	Has a systemic signalized intersection enhancement program that follows a Safe System-based framework and proactively implements FHWA's Proven Safety Countermeasures to manage speed and crash angles and consider risk exposure.	Reactively implements Proven Safety Countermeasures at signalized intersections	Does not routinely implement proven safety countermeasures (LPIs, protected left turns, roundabouts, medians, countdown signals, etc.) at signalized intersections.

Benchmark Topic	Key Strength	Enhancement	Opportunity
Systemic Enhancements for Uncontrolled Crossings	Has a crosswalk enhancement program that proactively implements a Safe Transportation for Every Pedestrian (STEP)-consistent countermeasure at uncontrolled crossings.	Has a crosswalk policy that is STEP-consistent but is only reactively to implementing Proven Safety Countermeasures	Does not have a policy or set practices for addressing crosswalk installation or enhancements using Proven Safety Countermeasures
Safety-focused Curbside Management	Has curbside management policy in place that prioritizes pedestrian and bicyclist safety	Has a curbside management program in place, but without a focus on safety	No curbside management program or policies in place
Policies Supporting Shared Micromobility	Has micromobility policy in place that prioritizes low stress facilities in areas with micromobility use (e.g., downtown areas) and speed regulators in geofenced locations. Micromobility is built into network planning and design for all projects with retail or in urban space	Requirements for micromobility are noted on a project-by-project basis	No micromobility policies are in place

Benchmark Topic	Key Strength	Enhancement	Opportunity
Connected and Automated Vehicle (CAV) Readiness	Has policy that strategizes preparation to meet and address oncoming challenges posed by CAV technology. As CAV technology is deployed, it is imperative to have strategies in place that discuss the interface between technology and human road users, the role of smart infrastructure, and the need for physical separation of AVs and vulnerable road users	Has EV charging policy and curbside management guidance, but not a full CAV readiness plan	No policy around CAV readiness
Heavy Vehicle Fleets and Truck Routing	Has policy that identifies various future fleet incorporation and funding (e.g., research on what type of fleet (Hydrogen Fuel Cell vs. Electric) best fits the agency) as well as identification of routes within City boundaries dedicated to buses, trucks, and other heavy vehicles. Identifying specific truck routes allows for parallel routes that can be identified as pedestrian and bicycle corridors	Has future fleet incorporation identified, but does not have a robust heavy vehicle and truck routing plan	No policy around future fleets and truck routing
Public Advertisements Supporting Safety Culture	Regularly runs culturally relevant and accessible education campaigns and outreach through various communication tools (e.g., bus and bus shelter ads, radio, social media)	Culturally relevant and accessible education campaigns occur on a project-by-project basis	Does not implement culturally relevant and accessible education campaigns

Benchmark Topic	Key Strength	Enhancement	Opportunity
Safety Implementation Plans and Policies			
Safe Road Users, Safe Roads, Safe Vehicles			
Adopted Safety Plan	Has an approved Local Road Safety Plan (LRSP) or other Caltrans-approved safety report that identifies funding sources and prioritization of projects within underserved communities. Safety upgrades are noted on the agency's High-Injury Network (HIN) and tied into repaving projects, CIP updates, etc.	Has received funding for a Safety Plan, which is underway and not yet adopted. Receives grant funding and/or developer fees, but projects are not tied to the High Injury Network or underserved communities	Does not have an LRSP or other Caltrans-approved Safety Plan. Moderately successful in obtaining grant funding or has trouble spending funds when given grants. Or unable to secure grants
Safe System Policy	Has a Safe System policy with redundancy built in for transportation projects with a checklist for the full set of incorporation of the Safe System elements. The policy includes all users and modes, affects new construction and maintenance, considers local context, and provides guidance for implementation	Has a Safe System policy, but does not identify how redundancy can be incorporated through the Safe System elements	Does not have a Safe System policy
Safety Data Collection and Assessment			
Safe Road Users			
Collection of Pedestrian and Bicyclist Volumes	Collects pedestrian and bicyclist volumes routinely with intersection counts and has a GIS database of counts. Database identifies key origin and destination locations that identifies patterns and needs in agencies policies and programs, especially in underserved communities	Collects pedestrian and bicyclist volumes on a project-by-project basis, but not routinely.	Does not collect pedestrian and bicycle volumes

Benchmark Topic	Key Strength	Enhancement	Opportunity
Inventory of Bikeways, Parking, Informal Pathways, and Key Bicycle Opportunity Areas	Maintains and routinely updates an AI-based inventory of missing and existing bikeways in GIS and includes bikeway projects in the CIP	Has a partial, static inventory of missing facilities and opportunity areas through Bike, Pedestrian, or Active Transportation Plans	Does not have an inventory of missing/existing bikeways, parking, informal pathways, or key bicycle areas
Inventory of Sidewalks, Informal Pathways, and Key Pedestrian Opportunity Areas	Maintains and routinely updates an AI-based inventory of missing and existing sidewalks and crosswalks in GIS and includes sidewalk and crosswalk projects in the CIP	Maintains an inventory of missing sidewalks, crosswalks, informal pathways, or pedestrian opportunity areas	Does not have an inventory of missing sidewalks, crosswalks, informal pathways, or pedestrian opportunity areas
Traffic Control Audit (Signs, Markings, and Signals)	Maintains and updates an inventory of signs, markings, other countermeasures, and signals (including phasing) in GIS	Has some GIS-based inventories of signs, markings, other countermeasures, and signals	Does not have a GIS-based inventory of signs, markings, countermeasures and signals
Crash History and Crash Reporting Practices	Employs a data-driven systemic safety or Vision Zero approach to regularly analyze crash data. Crash reporting is shared to key stakeholders in real time and reporting details are consistent through the agency	Reviews data only following fatalities or other high-profile incidents	Does not have set practices for data review
Surrogate Safety Measures for Proactive Monitoring	To inform safety projects, agency uses community feedback tools such as Street Story and innovative data collection techniques such as hard breaking, speed, and near miss data	Uses surrogate safety measures on a project-by-project basis	Does not use surrogate safety measures as part of data collection and assessment process
Updated Safety Action Plan	Has an LRSP that identifies routine data collection and assessment. Prioritized project list is updated based on crash data assessment	Completes crash data assessment on a project-by-project basis. Does not have an action plan that identifies regularity of assessment	Crash data assessment is ad-hoc and dependent on grant funded projects

Benchmark Topic	Key Strength	Enhancement	Opportunity
Pedestrian and Bicycle Network Planning and Design			
Safe Road Users, Safe Roads			
Complete Streets Policy	Has a Complete Streets policy that includes all users and modes, affects new construction and maintenance, considers local context, and provides guidance for implementation	Has a Complete Streets policy that is narrow in scope or applies only to public works projects	Does not have a Complete Streets policy
Active Transportation Plans	Has a recently updated Active Transportation Plan (or similar) with strategic prioritized list of projects that reflects current best practices (e.g., Level of Traffic Stress analysis, inclusion of Class IV protected bicycle facilities)	Has a Pedestrian or Bicycle Master Plan but it may be outdated and/or no recent projects from the Plan have been completed	Does not have a Pedestrian or Bicycle Master Plan
Existing bike network	Existing bike network includes best practice low stress facilities such as protected bikeways, bike boulevards, and protected intersections citywide or countywide	Bike network primarily includes Class I, II, and III facilities. There are gaps within the bike network and facilities do not accommodate all users	Bike network is not regularly maintained or routes are unclear to users
Existing pedestrian facilities	Existing pedestrian facilities includes low stress facilities and frequent use of landscape strips, medians, frequent crosswalks, and roadways are primarily two-to-four lane roads	Narrow sidewalks or sidewalk gaps, crosswalks with few or no safety enhancements, crosswalks are minimal, and roadways are primarily arterials	Missing key marked crosswalks and sidewalks, with few ADA improvements and no safety enhancements, and no pedestrian countdown signals
Bike Network Implementation Practices	Age 8 to 80 bicyclist considerations are included in the agency's policies and level of traffic stress is considered. A Bike or Other Safety Plan identifies low stress networks and funding mechanisms to implement a low stress network city/countywide	Spot locations have been identified through safety plan(s) for a low stress network. Plan also identifies additional proven countermeasures to be implemented as part of the project	Treatments are implemented where they fit within the right-of-way and vehicle LOS is not affected

Benchmark Topic	Key Strength	Enhancement	Opportunity
Pedestrian Network Implementation Practices	Pedestrian priority areas (PPA) are identified in a safety plan and the agency has policies prioritizing PPAs, crosswalk spacing, and design enhancements.	Spot PPA locations have been identified through safety plan(s). Plan also identifies additional proven countermeasures to be implemented as part of the project	Treatments are implemented on a project-by-project basis
Design guidelines and standards	Uses national best practices focused on bicycle and pedestrian safety for roadway and facility design guidelines and standards	Local standards reference national best practices, but are static or out of date, with minimal customized design policies for pedestrian and bicycle accommodations	Does not have comprehensive design guidelines or standards for pedestrian or bicyclist treatments
Roadway Surfaces for Bicycle Facilities	Roadway resurfacing projects and debris removal are prioritized for bicycle routes.	Roadway surface is acceptable on bicycle routes and routine maintenance, including debris removal, occurs.	Roadway surface conditions are poor on some bicycle facilities and maintenance is not prioritized for bicycle facilities
Attention to Bicycle Crossing Barriers	Separated bikeways and other innovative treatments, including geometric enhancements, are provided at intersections and interchanges	Higher-stress bike treatments are installed at some intersections and interchanges	Bike treatments are not installed at intersections or through interchanges
Attention to Pedestrian Crossing Barriers	Has a recently updated policy and comprehensive inventory of barriers. Has design guidelines and funding in place for addressing barriers	Has no policy, but has identified some barriers and taken steps to improve pedestrian access	Does not have a policy or practices for addressing barriers to walking
Intersection Control Evaluations	Uses intersection control evaluations to assess alternative traffic control (e.g., roundabout, signal, stop signs) performance (safety, ped/bike, etc.) and select appropriate control based on desired performance.	Uses relaxed warrants for traffic signals and/or all-way stops. If asked to by community or stakeholder may consider a roundabout or neighborhood traffic circle.	Uses MUTCD Warrants and/or does not have a practice of using Intersection Control Evaluations

Benchmark Topic	Key Strength	Enhancement	Opportunity
Sidewalk furniture or other sidewalk zone policies	Design standards require implementation of the sidewalk zone system. Does not allow apron parking or attached (unbuffered) sidewalks anywhere.	Design standards require implementation of the sidewalk zone system in some districts (e.g., CBD, neighborhood commercial, etc.).	There are no design standards requiring implementation of the sidewalk zone system.
Pedestrian and Bicycle Support Program			
Safe Road Users, Safe Speeds, Safe Roads, Post-Crash Care			
Street Tree Requirements	Has a street tree ordinance that improves pedestrian safety and access. The ordinance includes details on debris maintenance and actions to take when sidewalk buckling occurs	Has a street tree ordinance, but it does not improve pedestrian safety or access	Does not have a street tree ordinance
Bicycling Supportive Amenities and Wayfinding	Bicycle supportive amenities (parking, routing/wayfinding, water fountains, repair stations) are found community-wide	Some bicycle supportive amenities are found in key areas	Bicyclist supportive amenities are not provided in the community
Bicycle Parking Requirements	A bicycle parking ordinance is enforced for all development and a program is in place to install and maintain public bike parking in existing development	A bicycle ordinance for off-street parking is in place but no requirement exists to install parking for existing development	No bike parking ordinance or program in place
Pedestrian and Bicycle Safety Education Program	Pedestrian and bicycle education programs are data-driven and focused on local safety context; education programs are customized for different groups. The program includes education for drivers/motorists.	Has some traffic safety education programs that address pedestrians and bicyclists	Does not have pedestrian and bicycle safety education programs

Benchmark Topic	Key Strength	Enhancement	Opportunity
Enforcement	Police Department applies for annual OTS funding, and conducts sustained and data-driven enforcement efforts focused on education, behavior, and locations related to most severe bicycle and pedestrian crashes; enforcement is effective is KSI crashes decrease and there is lower racial disproportionality in traffic citations	Police Department conducts some data-driven enforcement activities related to bicyclist and pedestrian safety	Enforcement is not data-driven or Police Department does not have Traffic Safety Officer(s)
Pedestrian Walking Audit Program	Has significant and ongoing programs that include regular walking audits	Has no safety program, but has conducted walking audits sporadically	Does not have a pedestrian safety program and has not conducted a walking audit
Bicycling Safety Audit Program	Has significant and ongoing programs which include bicycling audits	Has some programs and may have conducted a bicycling audit	Does not have bicycling safety audit programs
General Plan: Provision for Pedestrian and Bicycle Nodes	Pedestrian and bicycle nodes are identified and pedestrian-oriented policies are in place for these nodes	Pedestrian and bicycle nodes are identified, but pedestrian and bicycle accommodations are not	Pedestrian and bicycle nodes are not identified
General Plan: Safety Element	On safety evacuation routes, agencies should identify creative solutions on how to evacuate residents safely and efficiently while maintaining and implementing low stress pedestrian and bicycle facilities	Safety Element does not identify the need to maintain low stress facilities and come up with creative solutions that does not prohibit the implementation of low-stress facilities on evacuation routes	Safety Element does not mention pedestrian and bicycle facilities on evacuation routes
Bike Ordinances (Sidewalk Riding)	Local ordinances allow for context-specific flexibility in sidewalk riding policies and enforcement (e.g., is there an adjacent bike facility?)	Local ordinance does not include section on sidewalk riding	Ordinances mandate that bikes are not allowed on sidewalks under any circumstances

Benchmark Topic	Key Strength	Enhancement	Opportunity
Vehicle Miles Traveled (VMT) Mitigation Strategies	Has a VMT Mitigation Strategy that uses the most recent guidance from CAPCOA to measure potential impacts of pedestrian and bicycle facilities	Mitigation measures identified in CAPCOA are used independently on a project-by-project basis	Does not use CAPCOA mitigation strategies
General Plan: Densities and Mixed-Use Zones	Has moderate to high densities in the CBD and mixed-use zones and progressive parking policies, and transportation impact analysis for new development prioritizes safety	Has moderate densities with separate uses; transportation impact analysis considers safety	Has low densities with separate uses; transportation impact analysis relies on LOS
Specific Plans, Overlay Zones, and Other Area Plans	Bicyclist and pedestrian-oriented design, walkability, or placemaking is stressed in the plans	Plans require bicycle and pedestrian accommodations, and placemaking	Plans do not address bicyclist or pedestrian needs or do not exist
Historic Sites	Cultural and historic preservation plans include a wayfinding, bicycle, and walkability focus	Historic areas have been identified, and pedestrian and bicycle access are addressed	No plan is in place, and little consideration is given for pedestrian and bicycle access in historic areas
Economic Vitality	Has several business improvement districts, an established façade improvement program, and progressive downtown parking policies	Has a business improvement district, façade improvement program, or downtown parking policies	Does not have business improvement districts, a façade improvement program, or downtown parking policies

Benchmark Topic	Key Strength	Enhancement	Opportunity
Post-Crash Care	Agency has an adopted LRSP or Caltrans-approved Safety Plan that identifies the importance of post-crash care and how the agency will implement identified countermeasures; this includes resources for medical rehabilitation, on-going advocacy group engagement (Mothers Against Drunk Driving, Families for Safe Streets), and resources for the adjudication process to ensure offenders receive proper sentencing and treatment	The adopted LRSP or Caltrans-approved Safety Plan is vague or does not include an Action Plan that identifies countermeasure implementation	The adopted LRSP or Caltrans-approved Safety Plan does not include action items and implementation strategies surrounding post-crash care
Proactive Approach to Institutional Coordination	Has identified obstacles and proactive coordination with advocacy groups and public health services where multiple facility owners (such as Caltrans or school districts) are involved, and has implemented efforts to overcome barriers	Has reactive coordination with advocacy groups and public health services with facility owners	Projects requiring cross-jurisdictional coordination are rarely coordinated and implemented
Coordination with Emergency Response	Emergency response is involved in all aspects of bicycle/pedestrian facility planning and design (including pilot testing), and they balance response times with bicyclist/pedestrian safety. Agency also works with emergency response to implement policies providing information on traffic incident management	Emergency response is involved in some aspects of bicycle/pedestrian facility planning and design	Emergency response is not involved in bicycle/pedestrian facility planning and design

Benchmark Topic	Key Strength	Enhancement	Opportunity
Coordination with Health Agencies	Coordinates regularly with health agencies in the planning of bicycle and pedestrian facilities and/or programs and collection of crash data	Health agencies have programs to promote healthy lifestyles through active transportation	Health agencies are not involved in bicycle/pedestrian safety or active transportation
Coordination with Transit Agencies	Bicycles are accommodated on all transit vehicles with overflow capacity available. The agency partners with transit providers to ensure safe and comfortable routes for biking and walking to transit stops and stations, including on roadways with both frequent bus service and bicycle facilities	Bicycles are accommodated on buses only, with accommodation limited to rack capacity. Some transit stops and stations safe and comfortable routes for biking and walking access	Bicycles are not accommodated on transit. There are few bicycle and pedestrian accommodations for accessing transit stops and stations

Implementation of Americans with Disabilities Act (ADA) Improvements (Key Strength)

Implementation of ADA improvements is key to making walking accessible and safe for everyone, regardless of ability or age.

Marin County uses Public Right-of Way Accessibility Guidelines (PROWAG) (https://www.access-board.gov/prowag/) for ADA improvements with consistent installation practices. The County installs audible pedestrian signals, directional curb ramps (two per corner), high-contrast truncated domes (detectable warnings), and contrasting edge bands at commercial driveways and intersections.

Suggestions for Potential Improvement

- Continue adding ADA ramps at intersections that currently lack them and upgrade non-complaint ramps
- Develop an ADA improvement program for items such as dual curb ramps, truncated domes, and audible pedestrian signals that applies consistent treatments. The program may provide an inventory, prioritization plan, and funding source for such improvements.

ADA Transition Plan for Streets and Sidewalks (Key Strength)

ADA Transition Plans identify gaps and issues in the County's current ADA infrastructure, prioritize projects for implementation, and set forth the process for bringing public facilities into compliance with ADA regulations. Transition Plans typically address a range of locations, such as public buildings, sidewalks, ramps, and other pedestrian facilities. Some cities also have ADA Coordinators, who are responsible for administering the Plan and reviewing projects for accessibility considerations.

The County has an ADA Transition Plan and an ADA coordinator.

Suggestions for Potential Improvement

- Consider prioritizing sub-areas within the County with the greatest pedestrian activity.
- Expand the ADA Transition Plan to include the public right-of-way, particularly the downtown area, other priority development areas, bus stops, and schools.
- Provide ADA standards and best practice training for engineering staff at all levels.

Ensure Safety for All Users is Prioritized, and Accessibility Maintained, During Construction and Road Maintenance Projects (Key Strength)

It is vital to ensure that dedicated space is maintained for vulnerable users during construction and road maintenance projects.

The County has a policy in place that details how to maintain accessibility and provide designated space for people biking and walking through a Construction Management Plan (CMP) and has practices related to the installation of ADA improvements such as audible pedestrian signals, directional curb ramps (two per corner), high contrast truncated domes (detectable warnings), and contrasting edge bands at commercial driveways and intersections.

Suggestions for Potential Improvement

- Create a policy that details how to maintain accessibility and provide designated space for pedestrians and bicyclists through a Construction Management Plan (CMP)
- An example is:
  - http://www2.oaklandnet.com/oakca1/groups/pwa/documents/memorandum/oak062315.pdf

Roadway Safety Coordinator (Key Strength)

A roadway safety coordinator provides guidance for pedestrian/bicycle planning efforts and oversees implementation of programs and helps with capacity building of staff. In a sampling of pedestrian-oriented California cities, a common denominator among cities (with a population over 100,000) is a full-time pedestrian/bicycle coordinator.

The County of Marin has a Roadway Safety Coordinator on staff who manages the agency's pedestrian and bicycle programs (e.g., Complete Streets Program and/or Vision Zero Program) and helps with capacity building of staff.

Suggestion for Potential Improvement

- Include dedicated time for the Roadway Safety Coordinator to write grants for both capital projects and ongoing funding for walking and biking related programs and optics as well as to liaison with local non-profit, advocacy groups, and schools.

Formal Advisory Committee (Key Strength)

Advisory committees serve as important sounding boards for new policies, programs, and practices. Responding to public concerns through public feedback mechanisms represents a more proactive and inclusive approach to bicycle and pedestrian safety compared to a conventional approach of reacting to crashes.

The County of Marin has a formal, active/on-going Transportation Advisory Committee guided by a charter or mission that includes the safety of vulnerable road users and whose activities focus on improving pedestrian and bicycle safety. The County also has Bicycle, Pedestrian, Complete Streets, Active Transportation, and/or Trails specific committees.

Equitable Community Engagement Strategy that Includes Community Based Organization (CBO) Involvement (Enhancement)

Having multiple touch points with the community creates transparency and open lines of communication between the County staff, residents, and businesses. Different kinds of formats and venues for public involvement and feedback allow for broader participation from the community. Consideration of local demographics (e.g., languages spoken) and the easiest formats for people to participate (e.g., online, in person but in the course of their daily activities, or at County-organized meetings) are important for meaningful and productive community dialogue.

Community engagement is an on-going process and does not only happen during the duration of the project, but also leading up to and after the project is completed.

The County of Marin has an equitable public outreach strategy, but formal community engagement events happen on a project-by project basis and/or without CBO partnerships.

Suggestion for Potential Improvement

- Add "safety" or bicycle and pedestrian specific issues as the "work type" when people place a pin in 311 for easy coding and understanding of issues.

- Provide quarterly or annual updates to the community on the "state of walking and biking", including recently completed projects, anticipated timeline for upcoming projects, and what the County plans to fund.

- Provide notices and interpretation in the most commonly spoken languages.
- Agencies that have an equitable community engagement strategy:
    - LA DOT Livable Streets: https://ladotlivablestreets.org/content-detail/Dignity-Infused-Community-Engagement-Strategy#:~:text=The%20Vision%20Zero%20Dignity%2DInfused,into%20the%20technical%20planning%20process

Traffic Calming or Speed Management Program (Key Strength)

Traffic calming programs and policies set forth a consensus threshold on neighborhood requests and approvals, as well as standard treatments and criteria.

The County has a speed management program that is reviewed annually alongside the CIP project list. Major arterials and neighborhood corridors include proactive speed management strategies and countermeasures are implemented to reach safe target speeds.

Suggestions for Potential Improvement

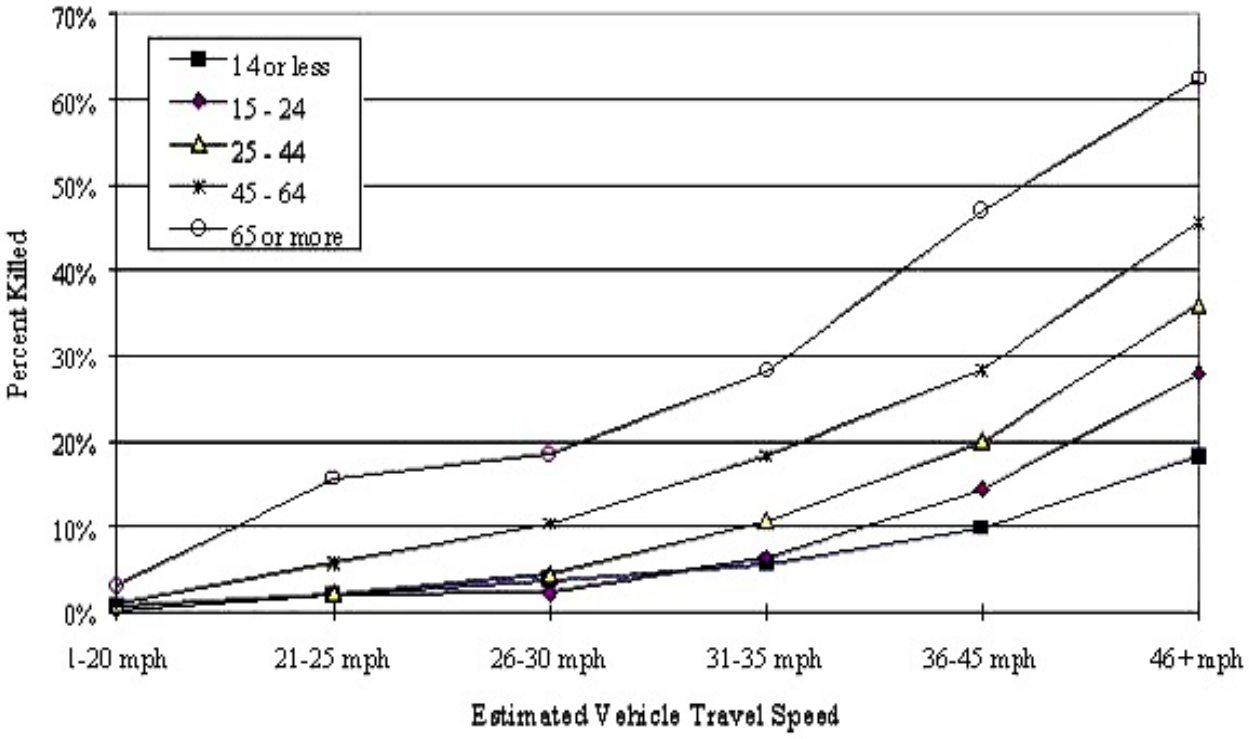
- Increase the amount of dedicated funding available for traffic calming each year.
- Expand the County's traffic calming toolbox to include other tools, such as raised crosswalks, raised intersections, chicanes, and traffic diverters. The County may review their speed management program annually alongside the CIP project list to identify major arterials and neighborhood corridors to include proactive speed management.
- Expand the County's practices to include proactive traffic calming measures instead of only responding to community requests. The County could consider allocating a portion of funding to proactive traffic calming, such as on bicycle boulevard streets or safe routes to schools, and then allocate the remaining funding to react to specific community requests.
- Refer to the following resources for traffic calming best practices:
    - *www.trafficcalming.org*
    - Traffic Calming Guidelines from the City of Danville (*https://www.danville.ca.gov/DocumentCenter/View/139/NTMP-Guidelines-Booklet-PDF*)
    - Neighborhood Traffic Management Program from the City of Anaheim (*https://www.anaheim.net/2841/NTMP3*)
    - ITE Technical Resources – Traffic Calming Measures: (*https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures/*)

Speed Limit Setting (Key Strength)

Agencies should regularly survey speeds and identify locations with high deviation from target speeds. Local municipalities use best practices for speed management from AB 43 to lower speed limits. Implementing lower speed limits is done using a consistent approach that prioritizes areas with historic under investment.

The County of Marin employs comprehensive practice to proactively review speed limits (i.e., every five years) and considers traffic calming before raising speed limits in pedestrian or bicycle zones. The County also regularly surveys speed and identifies locations with high deviation from target speeds. Agency uses best practices for speed management in combination with allowances from AB 43 to lower speed limits. Implementing lower speed limits is done using a consistent approach that prioritizes areas with historic under investment. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB43

Figure 3-1. Relationship between Vehicle Speed, Victim Age, and Fatalities



Suggestions for Potential Improvement

- Install traffic calming measures, signal coordination, and similar tools to maintain slower speeds appropriate for an urban community, particularly on streets that will be reviewed in the next speed survey.
- After complete streets improvement and other safety improvements are installed, conduct off-cycle speed surveys to review the speed limit and see if it needs to be reduced based on the improvements.

- Consider pedestrian volumes and known complete streets safety issues when setting speed limits and employ traffic calming strategies in locations where speed surveys suggest traffic speeds are too high for pedestrian and bicyclist safety.
- Ensure complete streets design standards have appropriate target design speeds for urban areas and do not contribute to a routine need for traffic calming.
- Consider the use of 15 MPH school zones.
- Additional information on AB 43 can be found here:
    - https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB43
    - San Francisco's Speed Limit Setting in Business Districts: https://sfmayor.org/article/san-francisco-lowers-speed-limits-targeted-business-districts-under-new-state-law

Safe Routes to Schools (Key Strength)

Safe Routes to School (SRTS) programs encourage children to safely walk or bicycle to school. The Marin County Bicycle Coalition was an early champion of the concept, which has spread nationally (refer to best practices at www.saferoutestoschools.org). SRTS programs are important both for increasing physical activity (and reducing childhood obesity) and for reducing morning traffic associated with school drop-off (as much as 30% of morning peak hour traffic).

The County has an ongoing Safe Routes to Schools program that is included as part of the agency's safety monitoring and is integrated with other policies and programs.

Suggestion for Potential Improvement

- Form an ongoing steering committee for the program (or each school) comprised of County staff, school district staff, PTA leaders, and other stakeholders that meets regularly to monitor efforts and identify new opportunities.
- Consider a safe route to school plan for all schools that is integrated with other policies and programs to conduct walk audits, identify recommended safety improvements, and secure funding for those improvements.

Systemic Signalized Intersection Enhancements (Key Strength and Enhancement)

The County has a systemic signalized intersection enhancement program that follows a Safe System-based framework and proactively implements FHWA's proven safety countermeasures to manage speed and crash angles and considers risk exposure. The County also reactively implements proven safety countermeasures at signalized intersections.

Suggestion for Potential Improvement

- Develop a Countywide crosswalk policy for the installation, removal, and enhancement of crosswalks at controlled and uncontrolled location. Ensure that it is consistent with best practices and recent research. This includes removing crosswalks only as a last resort and providing midblock crossings where they serve pedestrian desire lines.
- Consider developing a treatment selection "tool" to assist staff with the identification of applicable treatments in a given context.
- When crosswalk enhancements are identified, add them to a prioritized list that will be upgraded over time as funding is available.

FHWA resources include:

- Federal Highway Administration Safe System-Based Framework and Analytical Methodology for Assessing Intersections: https://safety.fhwa.dot.gov/intersection/ssi/fhwasa21008.pdf
- Federal Highway Administration Proven Safety Countermeasures: https://safety.fhwa.dot.gov/provencountermeasures/
- Federal Highway Administration STEP Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations: https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf
- National Cooperative Highway Research Program Application of Pedestrian Crossing Treatments for Streets and Highways: http://www.trb.org/Publications/Blurbs/175419.aspx

Systemic Enhancements for Uncontrolled Crossings (Enhancement)

The County has a crosswalk policy that is Safe Transportation for Every Pedestrian (STEP)-consistent but it only reactively implements proven safety countermeasures at uncontrolled crossings. Resources are:

- https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf
- https://safety.fhwa.dot.gov/provencountermeasures/

Safety-focused Curbside Management (Key Strength)

Shared mobility services are transportation services — typically offered by private companies — that offer ride-hail services (e.g., Lyft or Uber) for solo and pooled trips, bike share, and scooter share. Policies for shared mobility services can allow agencies to encourage, prohibit, or direct how they want shared mobility to work in their agency. They can allow for curb space management, clear organization of sidewalk space, and encourage (or discourage) private vendors to come to the County. Curb space management is a practice that requires curb access to be planned, designed, operated, and maintained to enable curb utilization with safe,

convenient, and multimodal access for all transportation users and provides driver education programs for fleet drivers.

The County has curbside management policy in place that prioritizes pedestrian and bicyclist safety and provides driver education programs for fleet drivers.

Suggestion for Potential Improvement

- Adopt a curb management plan to designate how the County will prioritize and proactive plan for curb uses (e.g., parking, passenger loading, commercial loading, ADA loading and parking, bicycle parking, bus-only lanes) and to make sure that the curb has the highest and best use of space.
- Consider micromobility policies (e.g., permitting, enforcement) in place to prioritize pedestrian and bicyclist safety and keep the sidewalk organized and usable for people of all abilities.
- Curbside management policy and education resources:
    - NYC Vision Zero Education: https://www1.nyc.gov/content/visionzero/pages/education
    - NYC Vision Zero Outreach: https://www1.nyc.gov/site/tlc/about/tlc-vision-zero-outreach.page
    - NYC Vision Zero Safety Toolkit for Trucks: https://www1.nyc.gov/content/visionzero/pages/trucks

Policies Supporting Shared Micromobility (Enhancement)

Micromobility prioritizes low-stress facilities in areas with high micromobility use and built into network planning and design for all projects with retail or in urban space.

Requirements for shared micromobility are noted on a project-by-project basis.

Suggestion for Potential Improvement

- Create a micromobility policy and implement speed regulators in geofenced locations
- NACTO Resources include: https://nacto.org/wp-content/uploads/2019/09/NACTO_Shared_Micromobility_Guidelines_Web.pdf

Connected and Automated Vehicle (CAV) Readiness (Opportunity)

As CAV technology is deployed, strategies and readiness to discuss the interface between technology and human road users, the role of smart infrastructure, and the need for physical separation of AVs and vulnerable road users.

The County has no policy around CAV readiness.

Suggestions for Potential Improvement

- Create a policy that strategizes the oncoming challenges posed by CAV technology
- FHWA Resources include:

  https://www.fhwa.dot.gov/policy/otps/policyanalysis.cfm

Heavy Vehicle Fleets and Truck Routing (Enhancement)

As the conversation around heavy vehicle fleets and truck routings are changing, local jurisdictions must be prepared to identify incorporation of these fleets along with funding. Identifying dedicated routes or boundaries within County boundaries allows for parallel routes of pedestrian and bicycle corridors.

The County has future fleet incorporation identified but does not have a robust heavy vehicle and truck routing plan.

Suggestion for Potential Improvement

- Create a policy that identifies future fleet incorporating, funding, and dedicated routes for daily use

Public Advertisements Supporting Safety Culture (Enhancement)

Culturally relevant and accessible education campaigns and outreach should occur regularly and on various platforms.

At Marin County, the culturally relevant and accessible education campaigns occur on a project-by-project basis.

Additional resources on successful safety culture campaigns can be found below:

- Stick to the Limits San Francisco: https://www.sticktothelimitsf.org/

Adopted Safety Plan (Enhancement)

A Local Road Safety Plan (LRSP) or Caltrans-approved safety report identifies dedicated, annual funding stream for bicycle and pedestrian projects within underserved communities. Bicycle and pedestrian projects can also be integrated in the other work that the County does, including repaving and other routine maintenance of the roadway network.

The County has received funding for a safety plan, which is underway and not yet adopted and receives grant funding and/or developer fees, but projects are not tied to the High Injury Network or underserved communities.

Some of the grant/funding sources that the County uses for bicycle/pedestrian projects are:

Dedicated Annual Funding Stream:

- General City Funds
- Local and regional impact fees
- County tax measure funds
- Local tax measure funds

Apply for Grants:

- Surface Transportation Program Funding
- Highway Safety Improvement Program (HSIP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Safe Routes to School Grant (SRTS)

Suggestion for Potential Improvement

- Partner with other agencies and continue applying for grant funding for both infrastructure and non-infrastructure projects.
- Integrate bicycle and pedestrian projects into the site plan review process for new development.
- Secure additional funding for repaving projects to allow for “quick build” projects and other bicycle and pedestrian safety improvements to be integrated into those projects.
- Establish a dedicated funding source for pedestrian and bicycle projects.

Safe System Policy (Key Strength)

A Safe System policy with redundancy built in for transportation projects includes all users and modes, affects new construction and maintenance, considers local context, and provides guidance for implementation.

The County has a safe system policy with redundancy built in for transportation projects with a checklist for the full set of incorporation of the safe system elements. The policy includes all users and modes, affects new construction and maintenance, considers local context, and provides guidance for implementation.

Collection of Pedestrian and Bicyclist Volumes (Key Strength)

Pedestrian and bicyclist volume data, along with a GIS database, is important for understand where people walk and bike. This establishes baseline data prior to project implementation and can help prioritize projects, develop crash rates, and determine appropriate bicycle and pedestrian infrastructure. The database helps to identify patterns and needs of underserved communities in local jurisdictions policies and programs.

The County collects pedestrian and bicyclist volumes routinely with intersection counts and has a GIS database of counts. Database identifies key origin and destination locations that identifies patterns and needs in agencies policies and programs, especially in underserved communities.

The types of bicyclist and/or pedestrian volume data that the County routinely collects are:

- Intersection turning movement
- Cordon (corridor)
- Pedestrian/bicycle counts collected as part of Transportation Impact Studies

Suggestion for Potential Improvement

- Routinely collect pedestrian and bicycle volumes by requiring them to be counted in conjunction with manual intersection turning movement counts. https://mtc.ca.gov/sites/default/files/4_AOC_Tech_Transfer_Seminar_Banner_06032013.pdf
- Geocode pedestrian volume data with GIS software along with other data such as pedestrian control devices and crashes to analyze data for trends or hotspots related to pedestrian safety.

Inventory of Bikeways, Parking, Informal Pathways, and Key Bicycle Opportunity Areas (Key Strength)

The County maintains and routinely updates an inventory of missing and existing bikeways in GIS and includes bikeway projects in the CIP.

Suggestion for Potential Improvement

- Continue maintaining the inventory of bikeways, bike parking, and future bike improvements into a GIS format for quick mapping and sharing.

- Identify a staff person responsible for maintaining the GIS data set.

Inventory of Sidewalks, Informal Pathways, and Key Pedestrian Opportunity Areas (Key Strength)

A GIS-based sidewalk inventory enables project identification and prioritization, as well as project coordination with new development, roadway resurfacing, and so on. This data set can be available on the County's website for knowledge sharing with the public as well as agencies.

The County maintains and routinely updates an AI-based inventory of missing and existing sidewalks and crosswalks in GIS and includes sidewalk and crosswalk projects in the CIP.

Suggestion for Potential Improvement

- Develop a Countywide crosswalk inventory in GIS and maintain it over time. This would allow for a systemic safety approach to enhancing crosswalks and allow the County to prioritize all crosswalk enhancement projects County wide for implementation over time and as money is available.

- Ensure that locations with pedestrian desire lines have safe crosswalks. An updated crosswalk policy can help determine the appropriate crossing treatment at uncontrolled locations without marked crosswalks.

- Consider establishing a program to work with property owners to repair damaged sidewalks outside their property. This can be a condition for the sale of the property.

Traffic Control Audit (Signs, Markings, and Signals) (Key Strength)

Cities have a wide variety of traffic control devices that regulate how bicyclist and pedestrians should use the street and interact safely with drivers. However, some cities do not have inventories how, when, and where this is installed. Creating a database of this information allows the County staff to know where infrastructure may be out of date or in needed of updates. For example, countdown signals are important pedestrian safety countermeasure. The 2012 California *Manual of Uniform Traffic Control Devices* (MUTCD) requires the installation of countdown pedestrian signals for all new signals. Likewise, the CA MUTCD also requires installation of bike detection at all actuated signals. Bike detection is a basic building block of the bike network to make sure that bikes can trigger the traffic signal. Inventorying bike detection and countdown signals allows the County staff to approach safety from a systems perspective and develop projects to close gaps in biking and walking infrastructure over time.

The County maintains and updates an inventory of signs, marking, other countermeasures, and signals (including phasing) in GIS.

Suggestion for Potential Improvement

- Include maintenance records within the GIS database inventory of signs, markings and signals.
- Develop a proactive monitoring program for ensuring the quality and proper functioning of traffic control devices.

Crash History and Crash Reporting Practices (Key Strength)

Safety is typically approach through both proactive and reactive measures. Identifying and responding to crash patterns on a regular basis and in real time is an important reactive approach to bicycle and pedestrian safety, which may be combined with other proactive measures. This is the traditional way most cities have approached safety. However, many are now looking to proactive safety to address safety issues on a system wide basis. This is often paired with a policy goal of getting to zero fatality or severe injury crash (commonly referred to as "Vision Zero").

The County uses local data from Police Services or similar, and requires crash data be included in Transportation Impact Assessments.

The County also has an LRSP that identifies routine data collection and assessment. Prioritized project list is updated based on crash data assessment.

The County employs a data-driven systemic safety or Vision Zero approach to regularly analyze crash data. Crash reports are shared with key stakeholders in real time and reporting details are consistent through the agency.

Suggestion for Potential Improvement

- Work with elected officials and department heads to adopt a Vision Zero policy formally stating the County's commitment to reducing the number of traffic-related fatalities and severe injuries to zero.

Additionally, with sufficient pedestrian volume data, the County could prioritize crash locations based on crash rates (i.e., crashes/daily pedestrian volume), a practice that results in a more complete safety needs assessment.

Surrogate Safety Measures for Proactive Monitoring

Innovative data collection techniques such as hard breaking, speed, and near miss data can provide additional insights into crashes. It is strongly suggested that the City and County consider utilizing a community feedback tool such as Street Story, developed by SafeTREC, to assist in collecting data.

https://safetrec.berkeley.edu/tools/street-story-platform-community-engagement

Complete Streets Policy

Complete Streets Policies are formal statements showing a local agency's commitment to planning and designing for all modes of travel and travelers of all ages and abilities.

The County has a Complete Streets policy.

Suggestion for Potential Improvement

- The following jurisdictions have established practices for complete streets, including implementation of these policies through multimodal level of service thresholds, and may serve as models:
    - Boston, Massachusetts, Boston's Complete Streets: http://bostoncompletestreets.org/about/
    - Philadelphia, Pennsylvania, Philly Free Streets: http://www.phillyfreestreets.com/
    - Baltimore, Maryland, Complete Streets Ordinance: https://transportation.baltimorecity.gov/completestreets
    - South Bend, Indiana, Complete Streets Policy: https://www.smartgrowthamerica.org/app/legacy/documents/cs/policy/cs-in-south-bend-resolution.pdf
    - Town of Ashland, Massachusetts, Complete Streets Policy: https://www.smartgrowthamerica.org/app/legacy/documents/cs/policy/cs-ma-ashland-policy.pdf

Active Transportation Plan (Key Strength)

This type of plan includes a large menu of policy, program, and practice suggestions, as well as site-specific (and prototypical) engineering treatment suggestions. Active Transportation Plan documents a jurisdiction's vision for improving walkability, bikeability, and bicycle and pedestrian safety; establish policies, programs, and practices; and outline the prioritization and budgeting process for project implementation.

The County has a recently updated Active Transportation Plan with strategic prioritized list of projects that reflects current best practices (e.g., Level of Traffic Stress analysis, inclusion of Class IV protected bicycle facilities).

Suggestion for Potential Improvement:

- Implement the low-hanging projects in the Active Transportation Plan and seek grant funding for major projects
- Pursue additional funding opportunities for programs identified by the Plan.

- Provide regular updates to the Plan, including bicycle and pedestrian facilities and design guidelines that address the needs of bicyclists and pedestrians of all ages and abilities
- Develop high injury networks for walking and biking to identify routes with the highest incidences of fatal and severe injuries for pedestrians and bicyclists. This will create a systematic safety analysis that can help in prioritizing limited resources.
- Consider identifying existing and missing bicycle and pedestrian infrastructure for safety improvement.

Existing Bike Network (Enhancement)

Innovative features such as protected bikeways, bike boulevards, and protected intersections citywide or countywide can decrease the level of traffic stress experienced by bicyclists, make biking more comfortable, and — in so doing — appeal to a wide range of bicyclists. Level of traffic stress refers to the level of comfort or discomfort a bicyclist might experience. Research conducted by the Mineta Institute in San Jose establishes levels of traffic stress on a scale for 1 to 4 with LTS 1 at the level that most children can tolerate and LTS 4 at the level characterized by "strong and fearless" cyclists (see: http://transweb.sjsu.edu/project/1005.html). A bicycle network that is attractive to the majority of the population would have low stress and high connectivity.

The County's existing bike network primarily includes Class I, II, and III facilities. There are gaps within the bike network and facilities do not accommodate all users.

Suggestion for Potential Improvement:

- Continue to identify funding sources and implement the proposed projects identified in the Active Transportation Plan.
- Develop design standards for bike boulevards, trails, paths, and landscaping for bicycle network.
- Create a GIS data for existing bike network to identify gaps and opportunities for improvements.

Existing Pedestrian Facilities (Key Strength, Enhancement and Opportunity)

The County's existing pedestrian facilities includes low stress facilities and frequent use of landscape strips, medians, frequent crosswalks, and roadways are primarily two-to-four lane roads. The County has the following pedestrian components: narrow sidewalks or sidewalk gaps, crosswalks with a few or no safety enhancements, crossings are minimal, and roadways are primarily arterials. The County also has missing key marked crosswalks and sidewalks, with few ADA improvements and no safety enhancements, and no pedestrian countdown signals.

Suggestion for Potential Improvement:

- Continue to identify funding sources and implement the proposed projects identified in the Active Transportation Plan.
- Create a GIS database for existing pedestrian infrastructure to identify gaps, inventory assets, and create opportunities for systemic safety analysis of all crosswalks.

Bike Network Implementation Practices (Key Strength)

Considering the safety and comfort of people biking leads to better projects that can encourage new biking trips and enhance safety for active transportation users today and in the future.

Bicycle Level of Traffic Stress (LTS) was originally developed by researchers at the Mineta Transportation Institute. LTS assesses the comfort and connectivity of bicycle networks.

Age 8 to 80 bicyclist considerations are included in the County's policies and level of traffic stress is considered. The low stress networks and funding mechanisms to implement a low stress network countywide are identified.

Suggestion for Potential Improvement:

- Prioritize bicycle projects to align with roadway resurfacing and projects that are near school sites.
- Secure enough funding for repaving and other complete streets projects to allow for installation of protected bike and pedestrian facilities and intersection improvements.
- Use LTS to strategically implement bikeways and traffic calming treatments that would improve LTS of existing bikeways.

Pedestrian Network Implementation Practices (Enhancement)

Considering the safety and comfort of people walking leads to better projects that can encourage new walking trips and enhance safety for active transportation users today and in the future.

Spot Pedestrian Priority Areas (PPA) have been identified through the Active Transportation Plan. The Plan also identifies additional proven countermeasures to be implemented as part of the project.

Suggestion for Potential Improvement:

- Identify pedestrian priority areas and have a policy in place around crosswalk spacing and design enhancements
- Secure enough funding for repaving and other complete streets projects to allow for installation of protected bike and pedestrian facilities and intersection improvements.

Design Guidelines and Standards (Key Strength)

Design guidelines and development standards create a clear set of documents that guide how all transportation improvements should be installed Countywide. As a result, they can create a consistent, high-quality biking and walking experience.

The County uses national best practices focused on bicycle and pedestrian safety for roadway and facility design guidelines and standards.

The County considers reducing vehicle speeds, intersection safety, driver intrusion into bicycle facility, reducing the number of vehicle travel lanes, narrowing vehicle travel lanes, removing on-street parking, restricting vehicle access while maintaining bicycle access on roadways (i.e., diverters or partial closures), reducing the bicyclist level of stress on each road way (mid-block), reducing the bicyclist level of stress at crossings, improving the usability of the network by bicyclists aged 8 to 80, and improving access to key destinations (e.g., parks, schools, employment centers, etc.) when designing bicycle facilities.

The County uses AASHTO Guide for the Development of Bicycle Facilities, AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities, FHWA Separated Bike Lane Planning and Design Guide, MassDOT Separated Bike Lane Planning and Design Guide, Caltrans DIB 89 Class IV Bikeway Guidance, and CA MUTCD and the Highway Design Manual when making design decisions.

The County has adopted development standards that are designed to provide a comfortable environment for pedestrians and bicyclists, such as bike parking must be located in close proximity to building entrances, and parking lots have required landscaping and pedestrian access standards.

Suggestion for Potential Improvement

- Consider adopting national bicycle and pedestrian safety best practices for roadway and facility design guidelines and standards:
    - NACTO Urban Street Design Guide: http://www.nyc.gov/html/dot/downloads/pdf/2012-nacto-urban-street-design-guide.pdf
    - CROW Design Manual for Bicycle Traffic
    - FHWA Separated Bike Lane Planning and Design Guide https://nacto.org/wp-content/uploads/2016/05/2-4_FHWA-Separated-Bike-Lane-Guide-ch-5_2014.pdf
    - MassDOT Separated Bike Lane Planning & Design Guide https://www.mass.gov/lists/separated-bike-lane-planning-design-guide

- ITE Recommended Practice for Accommodating Pedestrians and Bicyclists at Interchanges
- AASHTO Guide for the Development of Bicycle Facilities https://nacto.org/wp-content/uploads/2015/04/AASHTO_Bicycle-Facilities-Guide_2012-toc.pdf
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities https://transops.s3.amazonaws.com/uploaded_files/Update%20of%20the%20AASHTO%20Guide%20for%20the%20Planning%2C%20Design%2C%20and%20Operation%20of%20Pedestrian%20Facilities.pdf

Roadway Surfaces for Bicycle Facilities (Key Strength and Enhancement)

The quality of a roadway surface along bikeways is an important consideration when choosing to bike. Rough surface in a bike lane creates an uncomfortable bicycling experience and may also pose safety hazards.

The County's roadway resurfacing projects and debris removal are prioritized for bicycle routes, and roadway surface is acceptable on bicycle routes and routine maintenance, including debris removal, occurs.

Suggestion for Potential Improvement:

- Prioritize maintenance of roadways where bicycle facilities are present, particularly for closing gaps in the bikeway network or where improved pavement quality is needed on popular bicycle routes.
- Prioritize debris removal on roadways where bicycle facilities are present.
- Assess the needs for new and enhanced crosswalks and curb ramps with each repaving project. Include consideration of lane reductions and quick build projects such as paint and plastic median refuges and bulb outs; high-visibility crosswalks; and advanced yield markings.

Attention to Bicycle and Pedestrian Crossing Barriers (Key Strength)

Crossing barriers — such as railroads, freeways, and major arterials — may discourage or even prohibit bicycle access and are often associated with vehicle-bicycle crashes. Large intersections and interchanges and uncontrolled crossings can often deter bicyclists due to high speeds, high number of conflict points with vehicles, and high level of exposure. Identifying and removing barriers and preventing new barriers is essential for improving bicyclist safety and access. Crossing barriers also discourage or even prohibit pedestrian access and can create safety challenges for pedestrians. These can be similar to the biking barriers or present additional challenges.

Higher-stress bike treatments are installed at some intersections and interchanges. The County has a recently updated policy and comprehensive inventory of barriers and design guidelines and funding in place for addressing barriers.

The County uses the following crossing treatments at uncontrolled crossing: Rectangular Rapid Flashing Beacons (RRFB), Pedestrian Hybrid Beacon (PHB), advance yield limits, high visibility crosswalk striping, and restricting parking at crosswalk to increase visibility of crossing.

Suggestion for Potential Improvement:

- Use green routinely to highlight conflict zones at large intersection and interchanges. See Oakland's bicycle lane striping guidance for more information: http://www2.oaklandnet.com/government/o/PWA/o/EC/s/BicycleandPedestrianProgram/OAK024653
- To slow speeds at critical intersections, use smaller corner radii using small design vehicles appropriate for urban areas and updated standard plans to reflect this.
- Review design of slip/trap-right lanes at intersections and implement improvements.
- Implement best practice guidance on bicycle accommodation through interchanges and expressways, as appropriate, using the ITE's *Recommended Practice: Guidelines to Accommodate Bicyclist and Pedestrians at Interchanges* plus consideration of protected bike lane design.
- Identify and create an inventory of pedestrian barriers with targeted recommendations for phased improvements.
- Consider pedestrian barriers and needs in doing bicycle barriers assessment.

Intersection Control Evaluation (Enhancement)

Providing alternative traffic controls such as roundabouts, signals, and stop signs may improve pedestrian and bicycle safety by reducing speeds and controlling vehicle conflicts. Installing bicycling signals and limiting stop signs on bicycle routes may enhance bicycle mobility and safety. The CA MUTCD defines warrants for installing signals and stop signs.

The County uses relaxed warrants for traffic signals and/or all-way stops. If asked by community or stakeholder may consider a roundabout or neighborhood traffic circle.

The County's actuated signalized intersections are designed to include separation of through bicyclists from right-turning vehicles, clearly marked bicycle-vehicle conflict zones on approaches (colored bike lanes, etc.), tightened ramp and corner radii to reduce vehicle speeds, maximum length of a bicycle on approach between two vehicle travel lanes of 200 feet or less, dropping of bikeway facilities when free-right turns and/or double or triple-turn pockets are present, and striping of conflict zones or merge areas when free-right turns and/or double or triples-turn pockets are present.

Suggestion for Potential Improvement

- Develop specific signal and stop sign warrants that are pedestrian- and bicycle-friendly.

Sidewalk Furniture or Other Sidewalk Zone Policies (Key Strength)

Street furniture encourages walking by accommodating pedestrians with benches to rest along the route or wait for transit, trash receptacles to maintain a clean environment, street trees for shade, and so on. Uniform street furniture requirements also enhance the design of the pedestrian realm and may improve economic vitality.

In the County, design standards require implementation of the sidewalk zone system in some districts (e.g., CBD, neighborhood commercial, etc.).

Suggestion for Potential Improvement

- Adopt a Street Furniture Ordinance to include locations and furniture amenities other than those associated with transit stops, as appropriate.

Street Tree Requirements

Street trees enhance the pedestrian environment by providing shade and a buffer from vehicles, which increase pedestrian safety. Street trees may also enhance property values, especially in residential neighborhoods. However, street trees, when improperly selected, planted, or maintained, may cause damage to adjacent public utilities.

Suggestion for Potential Improvement

- Both City and County to develop a Street Tree Ordinance to provide guidance on permissible tree types and permitting requirements, also specifying a requirement for new trees plantings associated with development projects.

Bicycling Supportive Amenities and Wayfinding

In addition to designating roadway or paths in a bicycle network, supportive amenities (including parking, water fountains, and maintenance stations) can encourage bicycling. Wayfinding can both encourage bicycling and enhance safety by navigating cyclists to facilities that have been enhanced for bicyclist use or to local retail opportunities for economic growth.

Suggestion for Potential Improvement:

- Create and deploy a bicycle wayfinding strategy County wide as recommended in the Active Transportation Plan, as well as a Biking Guide.

- Develop a Biking Guide that includes a bike map and bicycle locker and rack locations.

Bicycle Parking Requirements

Safe and convenient bicycle parking is essential for encouraging bicycle travel (especially in-lieu of vehicle travel). Bicycle parking can also facilitate last-mile connections between two modes, such as bicycle parking at a transit station. To be effective, bicycle parking needs to be visible and secure and have enough capacity to accommodate bicycle demand, both long-term and

short-term. Long-term and short-term parking can be implemented through a bicycle parking ordinance as in the City of Oakland (see details at http://www2.oaklandnet.com/Government/o/PWA/o/EC/s/BicycleandPedestrianProgram/OAK024596).

Suggestion for Potential Improvement:

- Implement short-term and long-term, secured bicycle parking at all new development, consistent with the Active Transportation Plan and the APBP Bicycle Parking Guidelines, 2nd edition.
- It is suggested that the City of Mill Valley also utilizes guides (i.e. City of Oakland) for bike routes and bike parking.
- Site bicycle racks to be convenient for bicyclists, out of the way of pedestrians, and with good visibility for security, consistent with the APBP Bicycle Parking Guidelines, 2nd edition.
- Consider implementation of "branded" racks for the City/County (with a unique design or City/County's symbol).

Pedestrian and Bicycle Safety Education Program

Engineering treatments are often not enough on their own to realize full safety benefits associated with the treatment. Safety education programs complement engineering treatments and increase compliance. Education campaigns target drivers and people of all ages, especially school-age children where safe walking and biking habits may be instilled as lifelong lessons.

Suggestion for Potential Improvement

- Conduct a formal education campaign targeting people driving, walking, and biking about street safety. This includes advertisements on buses and bus shelters, an in-school curriculum, community school courses, public service announcements, and many other strategies. Consider a focus on speed and safe driving.

Enforcement

Enforcement of pedestrian and bicycle right-of-way laws and speed limits is an important complement to engineering treatments and education programs.

The 3-Es of Pedestrian Safety:

Engineering

Education

Enforcement

Suggestion for Potential Improvement

- Implement sustained pedestrian safety enforcement efforts and involve the media. Use enforcement as an opportunity for education by distributing pedestrian safety pamphlets in-lieu of, or in addition to, citations. The Miami-Dade Pedestrian Safety Demonstration Project provides a model for the role of media in the sustained effectiveness of enforcement. Information is available at:

http://www.miamidade.gov/MPO/docs/MPO_ped_safety_demo_eval_report_200806.pdf.

- Train officers in pedestrian safety enforcement principles. The Madison, Wisconsin Department of Transportation has developed a DVD in collaboration with the Madison Police Department to train traffic officers in pedestrian and bicycle issues (for more information see *http://www.walkinginfo.org/library/details.cfm?id=2865*). The Bicycle Transportation Alliance in Portland, Oregon offers Pedestrian Safety Enforcement Training (for more information on this five-hour course see: *http://www.bta4bikes.org/at_work/pedestriangrants.php).*

- Establish a radar gun check-out program for trained community volunteers to record speeding vehicles' license plate numbers and send letters and/or document occurrences. Radar gun check-out programs are available in Albany, Pleasanton, and Thousand Oaks, California, among other cities (for more information on the Pleasanton program see: *http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2004/04/07/MNG8N6/04/07/MNG8N6 1MGG1.DTL).*

Pedestrian Walking Audit Program

Walking audits provide an interactive opportunity to receive feedback from key stakeholders about the study area and to discuss the feasibility of potential solutions. They can be led by County staff, advocacy groups, neighborhood groups, or consultants.

Suggestion for Potential Improvement

- Include regular walking audits in County wide pedestrian safety program, based on the suggestions of this CSSA. This effort may complement other "green" or health-oriented programs within the County.

Bicycling Safety Audit Program

When the County staff and key stakeholders ride along study corridors and experience key route and crossing challenges and best practices, consensus is more readily reached on a vision and action plan for safety enhancements.

- Include regular bicycling audits in the Countywide bicycle safety programs. Encourage interdepartmental participation.

- Routinely conduct bicycle safety audits of key corridors throughout the County, including those with recent improvements, those with heavy bicycle demand, and those with high crash rates.

- Collaborate with schools on projects beyond the school district boundaries.

General Plan: Provision for Pedestrian and Bicycle Nodes

Planning principles contained in a local agency's General Plan can provide an important policy context for developing pedestrian-oriented, walkable areas. Transit-oriented development, higher densities, and mixed uses are important planning tools for pedestrian-oriented areas. The General Plan identifies pedestrian priority areas, which are zones in which high volumes of pedestrian traffic are encouraged and accommodated along the sidewalk.

Suggestion for Potential Enhancement

- Create an overlay district for pedestrian priority areas with special pedestrian-oriented guidelines, such as relaxing auto Level of Service standards and prioritizing pedestrian improvements. Prioritize sidewalk improvement and completion projects in these nodes.
- Utilize vehicle miles traveled (VMT) for future transportation impact analysis.

General Plan: Safety Element

SB 99 and AB 747 are legislation around safety evacuation during natural disasters. Local jurisdictions should identify creative solutions on how to evacuate residents safely and efficiently while maintaining and implementing low stress pedestrian and bicycle facilities.

Bike Ordinances (Sidewalk Riding)

Suggestion for Potential Improvement:

- Consider allowing for context-specific flexibility in sidewalk riding policies and enforcement

Vehicle Miles Traveled (VMT) Mitigation Strategies

A VMT Mitigation Strategy should use the most recent guidance from California Air Pollution Control Officers Association (CAPCOA) to measure potential impacts of pedestrian and bicycle facilities.

- CAPCOA Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity: https://www.caleemod.com/documents/handbook/full_handbook.pdf

General Plan: Densities and Mixed-Use Zones

Planning principles contained in a local agency's General Plan can provide an important policy context for developing bicycle-oriented and walkable areas. Transit-oriented development, higher densities, and mixed uses are important planning tools for pedestrian-oriented areas.

Suggestion for Potential Improvement

- Utilize vehicle miles traveled (VMT) for future transportation impact analysis.
- Consider allowing moderate to high densities in the downtown and mixed-use zones as well progressive parking policies, such as shared parking and demand-based pricing.

- Consider multi-modal trade-offs in the transportation impact analysis for new development, so that the safety and needs of people walking and biking is weighed heavily and vehicular delay is not the primary performance measure.

- Ensure that wide sidewalks, high quality, protected bike lanes, and intersection safety improvements are included with all new development projects, particularly where densities are higher

- Strongly weigh walking and biking performance measures as well as safety metrics in determining appropriate intersection improvements and street design.

Specific Plans, Overlay Zones, and Other Area Plans

Suggestion for Potential Improvement

- Emphasize bicyclist and pedestrian-oriented design, walkability, and/or placemaking in all new specific plans, overlay zones, and other area plans.

Historic Sites (Enhancement)

Historic walking routes or bike trails, such as the famous Freedom Trail in Boston, encourage active transportation and enhance economic vitality.

In the County, historic areas have been identified, and pedestrian and bicycle access are addressed.

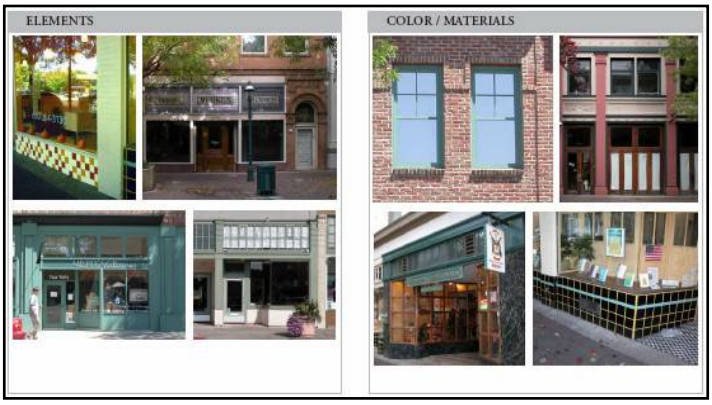
Suggestion for Potential Improvement

- Continue to implement the goals, policies and programs that support walking trips to showcase natural or local sites of interest, and link key features of the County. Maps of the tour route and historic documentation materials could be made available online or as a mobile app in addition to wayfinding signs, maps, and plaques could also be provided throughout the County. Consider other areas of the County for walking tours and historic signs.

- Consider upgrading History Walk signs with larger text to improve legibility and wayfinding.

Economic Vitality (Opportunity)

Improving bicycle and pedestrian safety and walkability can enhance economic vitality. Similarly, enhancing economic vitality through innovative funding options such as Business Improvement Districts (BIDs), parking management, and facade improvement programs can lead to more active areas and encourage walking and bicycling.



Sample store facades

Suggestion for Potential Improvement

- Activate the built environment in business areas through BIDs and façade improvement programs.
- Use wayfinding, walking routes, and events to direct pedestrians to commercial areas throughout the area.
- Install bicycle parking in commercial areas and provide safe, comfortable bike facilities in commercial areas to make it convenient and fun to get to local businesses.

Post-Crash Care

An agency's adopted LRSP or Caltrans-approved Safety Plan should include resources for the agency to implement identified countermeasure for medical rehabilitation, on-going advocacy group engagement, and resources for the adjudication process to ensure offenders receive proper sentencing and treatment.

Proactive Approach to Institutional Coordination

Institutional coordination associated with multiple agencies and advocacy groups is a critical part of the work of any municipality. Non-local control of right-of-way and differing policies regarding pedestrian and bicyclist accommodation can make the work complex.

The County has identified obstacles and proactive coordination with advocacy groups and public health services where multiple facility owners (such as Caltrans or school districts) are involved, and has implemented efforts to overcome barriers.

Suggestion for Potential Improvement

- Work with the local school districts to establish a policy on neighborhood-sized and oriented schools as part of a Safe Routes to School policy.
- Work with the school districts to establish suggested walking routes and address potential barriers to pedestrian or bicycle access.

Coordination with Emergency Response (Enhancement)

Emergency response requires special roadway design considerations that sometimes conflict with bicycle and pedestrian treatments. One example is the design of turning radii at intersections. Bicyclists and pedestrians benefit from the reduced vehicle speeds of smaller radii, but larger vehicles, such as fire trucks, have more difficulty performing the turn within the smaller space. These conflicts require consensus building between the County and the respective departments. Consensus building could include pilot testing of alternative treatments, such as a model traffic circle in an open field.

In the County, the emergency response is involved in some aspects of bicycle/pedestrian facility planning and design.

Suggestion for Potential Improvement:

- Include the Fire Department early in the process as a stakeholder in the Williams Street and Bancroft Street separated bikeway projects to ensure access needs are accommodated.
- Balance the trade-off between traffic calming safety treatments such as roundabouts or partial street closures and longer emergency response times.
- Encourage emergency and transit responders to participate in test runs of roadway designs that are aimed to reduce speed and improve bicycling access.
- Implement policies providing information on tragic incident management

Coordination with Health Agencies (Enhancement)

Involving non-traditional partners such as public health agencies, pediatricians, etc., in the planning or design of pedestrian and bicycle facilities may create opportunities to be more proactive with pedestrian and bicycle safety, identify pedestrian and bicycle safety challenges and education venues, and secure funding. Additionally, under-reporting of pedestrian-vehicle and bicycle-vehicle crashes could be a problem that may be partially mitigated by involving the medical community in pedestrian and bicycle safety planning.[2]

The health agencies in Marin County have programs to promote healthy lifestyles through active transportation.

Coordination with Transit Agencies (Key Strength)

Providing safe and comfortable biking and walking routes to transit stops and stations, and the ability to take bicycles on-board transit vehicles increases the likelihood of multi-modal trips.

[2] Sciortino, S., Vassar, M., Radetsky, M. and M. Knudson, "San Francisco Pedestrian Injury Surveillance: Mapping, Underreporting, and Injury Severity in Police and Hospital Records," *Accident Analysis and Prevention*, Volume 37, Issue 6, November 2005, Pages 1102-1113

In the County, Bicycles are accommodated on all transit vehicles with overflow capacity available. The County partners with transit providers to ensure safe and comfortable routes for biking and walking to transit stops and stations, including on roadways with both frequent bus service and bicycle facilities.

Suggestion for Potential Improvement:

- Work with transit agencies, Caltrans, and other relevant partners to improve access and safety to stations and bus stops.

4. COMPLETE STREETS AUDIT RESULTS AND SUGGESTIONS

4.1. OVERVIEW

Complete Streets audits are typically conducted as an initial step to improve the street environment for all travel modes within the selected area. Many individuals can participate: residents, stakeholders, and affiliated individuals. During the audits, positive practices are observed and issues and opportunity areas are noted. Observations are made of the interactions among motorists, pedestrians, and bicyclists. Observations are based on the behavior of these different road users, particularly at intersections. For each opportunity area, the group discusses possible suggestions to address safety and operational concerns. Complete Streets audits are highly interactive, with many field observations. The audits are a means to observing and learning how to “see through the eyes of pedestrians and bicyclists.”

This chapter presents observations and suggestions made during field observations conducted on March 7 and 8, 2022. On March 7 the evaluator previewed the focus areas; on March 8 the City/County site team jointly conducted the site visit.

Suggestions in this chapter are based on best practices and discussions with participants regarding local needs and feasibility. These suggestions are based on limited field observations and time spent in and around the City and County by the CSSA evaluator. These suggestions are intended to guide City and County staff in making decisions for future safety improvement projects; they may not incorporate all factors relevant to pedestrian and bicycling safety issues in the City and County. This report is conceptual in nature, and conditions may exist in the focus areas that were not observed and may not be compatible with suggestions presented below. Before finalizing and implementing any physical changes, City and County staff may choose to conduct more detailed studies or further analysis to refine or discard the suggestions in this report, if they are found to be contextually inappropriate or appear not to improve bicycling or pedestrian safety or accessibility due to conditions including, but not limited to, high vehicular traffic volume or speeds, physical limitations on space or sight distance, or other potential safety concerns.

Section 4.2, Overview of Focus Areas, lists each area and its key issues, and locates the areas on a map.

Section 4.3, Focus Areas, contains detailed illustrated subsections for each area.

4.2. OVERVIEW OF FOCUS AREAS

Miller Avenue to Panoramic Highway route

City and County staff requested reviews of the nine focus areas listed in Table 4-2. Focus Areas 1-8 are in ascending (climbing) order along a popular 2.2-mile route between Miller Avenue and Panoramic Highway via street segments listed in Table 4-1. Muir Wood Road, the north access to Muir Woods National Park, intersects Panoramic Highway at Sequoia Valley Road. *(Note that this route is not the only way to Panoramic and Muir Woods from Mill Valley and vicinity. Another is via State Route 1 from Tamalpais Valley Junction / "Tam Junction.")*

The Montford Avenue – Molino Avenue – Edgewood Avenue – Sequoia Valley Road route has narrow lanes, few shoulder segments wide enough for bicyclists to climb independently, and several curves that limit sight lines for passing bicyclists – especially westbound (uphill).

Table 4-1: Segments of route to Panoramic Highway via Sequoia Valley Road

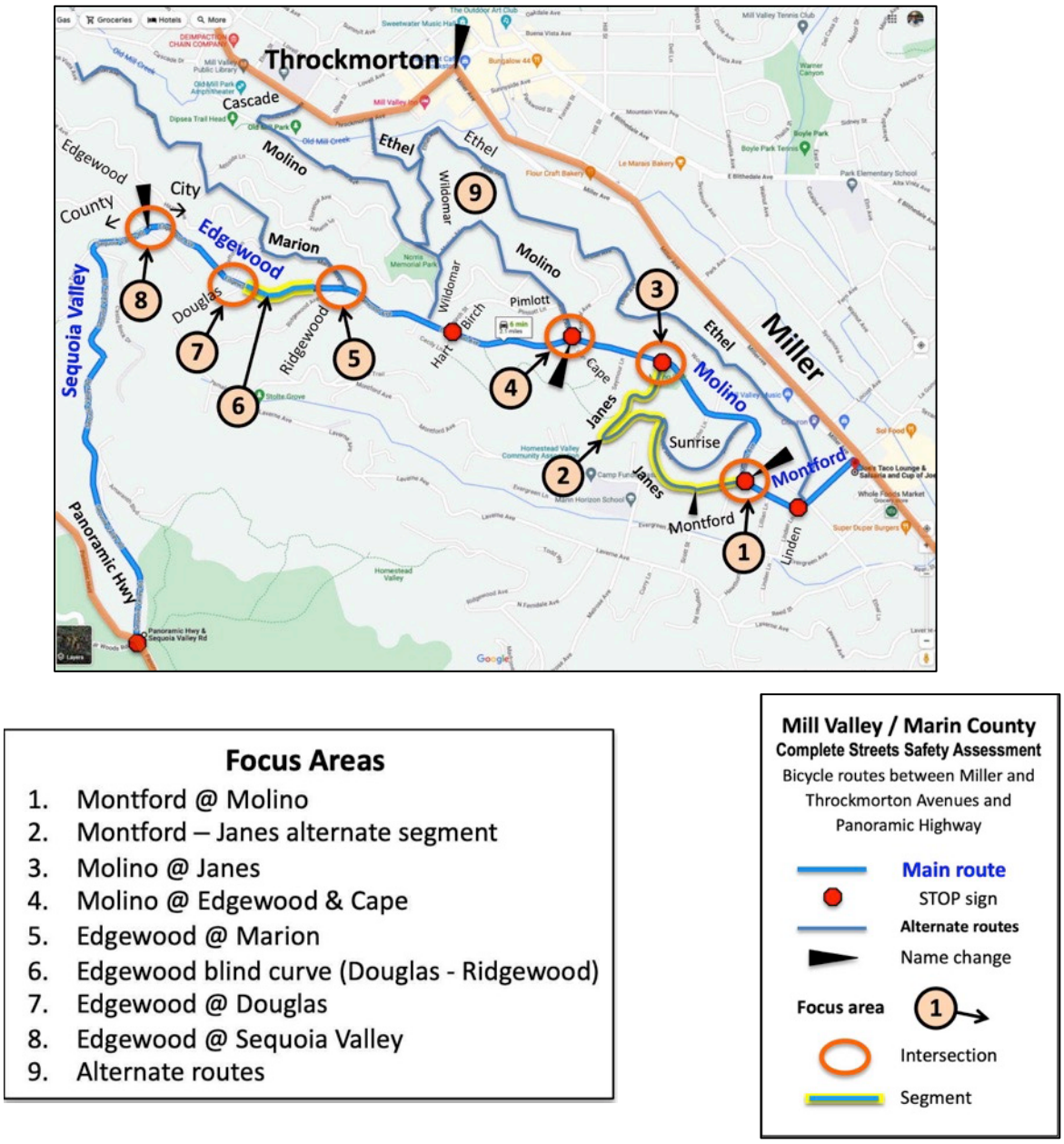
#	Street	Between	And	Notes
1	Montford Avenue	Miller Avenue	Molino Avenue	Gentle grade
2	Molino Avenue	Montford Avenue	Edgewood Avenue	Steep between Montford Avenue and Janes Street
3	Edgewood Avenue	Molino Avenue	Sequoia Valley Road	Blind curve east of Cedarwood Lane
4	Sequoia Valley Road	Edgewood Avenue	Panoramic Highway	Blind curve east of Edgewood / SVR junction

Focus Area 9 covers several lower-traffic routes to Sequoia Valley Road from Miller Avenue or Throckmorton Avenue that avoid segments of the main Montford – Molino – Edgewood route.

Table 4-2: Focus Areas

#	Focus Area	Issues and opportunities
1	Montford / Molino intersection	Uphill (westbound) decision point for Montford – Janes alternate route segment (Focus Area 2)
2	Montford - Janes alternate route segment	Alternative to steep segment of Molino.
3	Molino / Janes intersection	Downhill (eastbound) decision point for Montford –Janes alternate route segment (Focus Area 2). Walking path junction.
4	Molino / Edgewood / Cape intersection	
5	Edgewood / Marion / Ridgewood intersection	
6	Blind curve between Douglas and Ridgewood	Rideable width, edge lines, signs
7	Edgewood / Douglas intersection	Wide pavement area, STOP sign visibility
8	Edgewood / Sequoia Valley intersection	Lane alignment, median refuge, signs
9	Alternate routes	Bicycle guide signs and markings

Figure 4-1 highlights the focus areas on a map. Detailed maps appear in each focus area subsection.



Focus Areas

1. Montford @ Molino
2. Montford – Janes alternate segment
3. Molino @ Janes
4. Molino @ Edgewood & Cape
5. Edgewood @ Marion
6. Edgewood blind curve (Douglas - Ridgewood)
7. Edgewood @ Douglas
8. Edgewood @ Sequoia Valley
9. Alternate routes

Mill Valley / Marin County
Complete Streets Safety Assessment
Bicycle routes between Miller and Throckmorton Avenues and Panoramic Highway

Main route
STOP sign
Alternate routes
Name change
Focus area 1
Intersection
Segment

Figure 4-1: Map of Focus Areas

City / County jurisdiction

Along many of the route segments examined in this report, the road in question defines City of Mill Valley's boundary with Marin County, i.e., the north side is in the City and the south side is in the County. As such, suggestions throughout this report apply to the City or County as geographically appropriate, though in most cases City/County collaboration on integrated solutions for an intersection or street segment would certainly be advised.

Concerns applicable along entire route

At the initial meeting on the field day, residents and staff relayed several concerns applicable along the entire route:

- Motorists, especially those traveling westbound (uphill), do not pay attention to oncoming motorists when deciding when to pass bicyclists.
- Some motorists pass bicyclists on blind curves by straddling the centerline, but may not anticipate oncoming motorists, and those oncoming motorists may not anticipate an oncoming vehicle partly crossing the centerline.
- Most of the route has a double-yellow (no passing) centerline, but much of it is implemented with two lines of yellow raised reflective pavement markers. Some motorists do not understand that this is legally the same as a painted double yellow line.
- Pedestrians walk along the roadway (on the paved or unpaved shoulder where available and along the edge of the travel lane where no shoulder is present). Sufficient width for walking is not present at many locations. Pedestrians cross the road to visit neighbors, and to access the City's network of walking trails and stairs.
- Some vegetation (bushes, hedges) encroaches into the street or partly obstructs the shoulder. This reduces width for walking and forces bicyclists to ride further from the pavement edge than they otherwise might find safe. (City of Mill Valley requires adjacent homeowners to maintain vegetation along their frontage.)
- City of Mill Valley has miles of hiking trails, some designated as Steps Lanes & Paths / SLPs. There are no designated crossings where many of these facilities intersect the route.
- Residents and visitors drive forward into driveways because it is too hazardous to back in. If the driveway has no internal turnaround this means that motorists must back out onto the road. Gaps in traffic to enable backing out are short.
- Students use the road to bicycle to local schools, some on electric bikes.
- Some residents feel that traffic calming is needed.
- During afternoons and evenings, glare from the setting sun at certain times of the year and at certain locations along the study route can blind westbound motorists. This is especially the case at the following locations: at the top of the steep curve at Molino; Janes Street and just west of the intersection of Molino-Edgewood-Cape Court; and immediately west of the blind curve between Ridgewood Avenue and Cedarwood Lane.

Neighbor / Resident input

Residents of City of Mill Valley and adjacent unincorporated Marin County are organized into NFPA Recognized Firewise Communities for wildfire prevention, preparedness and evacuation. There are also NRGs (Neighborhood Response Groups) focused on disaster preparedness, evacuation and response for any disaster, including and beyond wildfire. The Lower Edgewood Firewise Community areas border the route on both the north (City) and south (County) and their members also discuss traffic safety issues along the route.

At the initial meeting on the field day, a resident shared a map of input obtained from residents along Edgewood Avenue between addresses #50 and #329. The map indicates four intersections considered unsafe (most are Focus Areas in this report), many driveways from which exiting is

considered hazardous, the location of a blind curve east of Cedarwood Lane (Focus Area 6), and the location of the Dipsea Trail steps at the Edgewood Avenue / Sequoia Valley Road intersection (Focus Area 8).

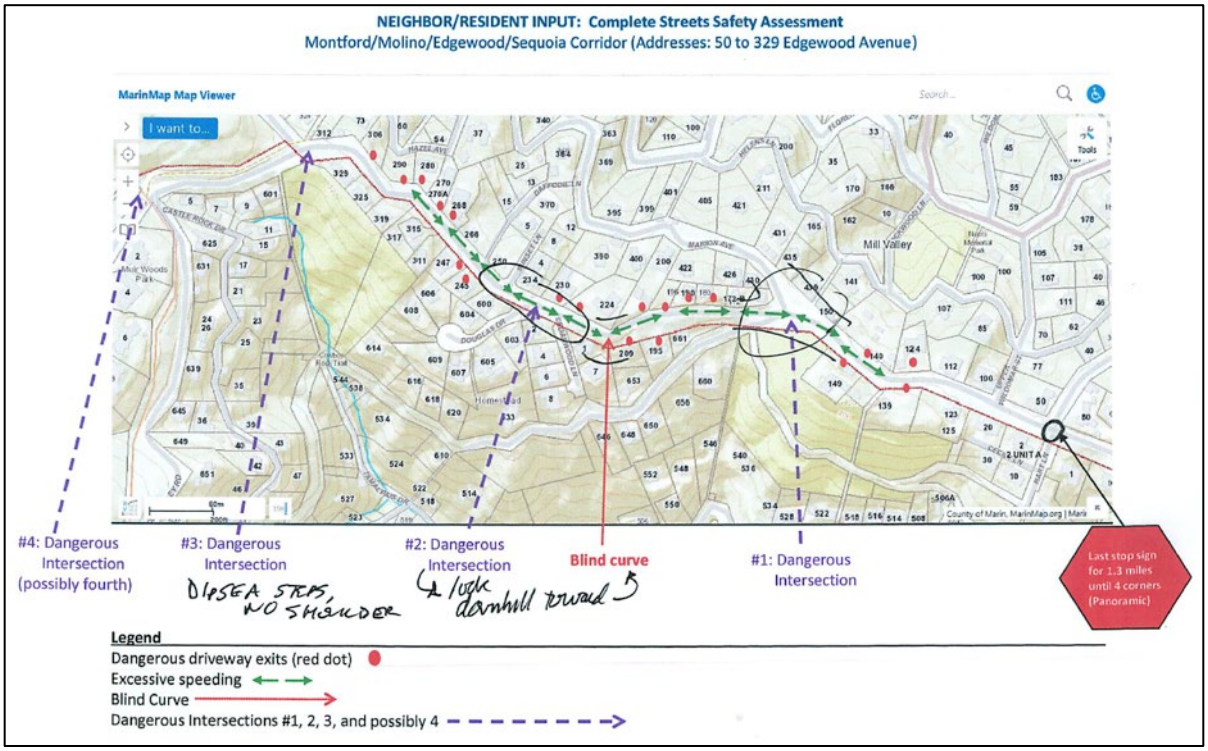


Figure 4-2: Neighbor / Resident-Provided Map

Encouraging safe coexistence by motorists and bicyclists

The route has one travel lane in each direction and a double-yellow (no passing) centerline. There is insufficient width for bike lanes, although on a few segments there is some paved width outside of the edge line that if safely rideable by bicyclists can enable motorists to overtake without crossing the centerline.

Despite the no-passing centerline, motorists routinely pass bicyclists by partly or fully encroaching into the opposing lane. Some state vehicle codes include a so-called “Obstacle Clause” allowing this maneuver if performed safely, whenever a traveler or object ahead is stopped or moving much slower than normal traffic. Although the California Vehicle Code (CVC) has no such provision, this maneuver is routinely seen state-wide, including in Mill Valley and Marin County, and is not typically cited by law enforcement unless performed unsafely. The safety challenge is two-fold: to encourage passing of bicyclists with adequate clearance when safe, and to discourage or physically prevent passing of bicyclists where it is unsafe.

The California MUTCD has two relevant regulatory signs. The R4-11 (“[BIKES] MAY USE FULL LANE”) reminds all travelers that bicyclists may legally occupy a lane that is too narrow for safe passing within the lane (14’, not counting the door-opening zone along parallel-parked vehicles, if present). However, this sign does not by itself cue safe passing behavior. In contrast, that is the purpose of California’s R117 (CA) sign (“PASS [BIKES] 3 FT MIN”). Because bicyclists on

significant grades often ascend much slower than cars but descend at motor traffic speeds, the R117 (CA) may be applicable uphill and the R4-11 downhill.

Before the R4-11 and R117 (CA) signs were available, it was common to install Share The Road ("STR") assemblies (W11-1 Bicycle Symbol + W11-15p SHARE THE ROAD plaque) to encourage cooperation in shared lanes. (There is a STR assembly on westbound Edgewood Avenue at Marion Avenue.) However, FHWA's MUTCD FAQ now discourages STR installation:

> **Q: Should "share the road" signing be used to inform drivers of the likely presence of bicyclists and to inform them to pass bicyclists safely?**
>
> A: **…**In the years since its adoption in the 2000 MUTCD, research has shown that the "share the road" message when applied to bicyclists does not adequately communicate the responsibilities of either user group on the roadway. Road users are unclear whether "share the road" means that drivers should give space when passing or that bicyclists should pull to the side to allow drivers to pass. Where bicyclists are expected or preferred to use the full lane, that message is more clearly communicated with the Bicycles May Use Full Lane (R4-11) sign, supplemented by shared-lane markings as appropriate….
>
> (https://mutcd.fhwa.dot.gov/knowledge/faqs/faq_part9.htm#signsq5)

This FHWA guidance does not mention California's R117 (CA) sign because it is state-specific.

a) CA MUTCD R117 (CA)

b) MUTCD R4-11

c) Share The Road assembly (now discouraged by FHWA)

Figure 4-3: Signs to encourage safe shared lane use

Edge of roadway conditions

Edge conditions for bicycling and walking vary considerably (Figure 4-4) and frequently.

a) Rideable paved shoulder.
Landscape width available for walkway.

b) No rideable paved shoulder.
Landscape width available to create one.

c) Rideable and walkable paved shoulder

d) Narrow but rideable paved shoulder.
Paving gravel parking area would create turnout.

e) Unrideable gutter; encroaching landscape

f) Gutter, no sidewalk

g) Gutter, buffered sidewalk that ends at curve

Figure 4-4: Examples of Edge of Roadway Conditions Along Route

For bicyclists, ideally there would be a paved area to the right of the traffic lane, demarcated by a stripe, of rideable width (4' minimum), with its surface co-planar with the traffic lane (images (a) and (c)). However, this condition is not available on many segments along the route.

For pedestrians, ideally there would be an all-weather walkway adjacent to the bicycle area. Some adjacent ground cover plantings are wide enough to reuse some width for a walkway. Even a walking area serving only a few parcels is valuable if it enables neighbors to connect on foot. Where no walkway width is available, pedestrians walk in a paved shoulder.

Where ground cover landscape extends to the paved shoulder (images (a) and (b)) it may be possible to trim it back to uncover some paved area, and/or use some of the landscape width to create a walkway adjacent to the shoulder.

Bicyclists are neither required nor encouraged to ride in a gutter (images (g) and (h)), however a gutter without concrete defects and without a "lip" at the asphalt/concrete joint can offer some recovery width for bicyclists who wander off the asphalt.

Some fronting homes have wide gravel parking areas that if paved properly could serve as bicycle turnouts when empty (image (d)).

Suggestions applicable to entire route

Table 4-3: Suggestions applicable along entire route

#	Item	Suggestion	Rationale
1	Double yellow centerline	Replace "raised dots" treatment with solid painted or thermoplastic lines. Add a NO PASSING sign.	Increase motorist compliance with passing prohibitions
2	Edge vegetation (no unpaved walkable shoulder)	Maintain tall hedges and bushes at least 12" back of curb or pavement edge, preferably further	Enable bicyclists to ride as close to the pavement edge as is safe
3	Edge vegetation (unpaved walkable shoulder)	Trim back far enough that at least one person can walk off-pavement (2.5' width per adult)	Maximize width for walking.
4	Gravel from driveways	For new or reconstructed driveways, require that the apron be paved back from the street to or behind the property line.	Bicycle safety -- reduce / eliminate gravel migration onto roadway
5	Edge hazard markings for bicyclists	Discuss what, if any, edge markings might inform bicyclists of a sharp drop-off or otherwise un-rideable edge	Warn bicyclists not to ride close to the edge along that segment. Reduce the likelihood of run-off-pavement injury crashes

4.3. FOCUS AREAS

4.3.1. FOCUS AREA #1: Montford Avenue / Molino Avenue intersection

Overview

This is the first focus area in ascending (westward) order along the main route between Miller Avenue and Panoramic Highway described in Section 4.2. It is a Y-junction with the main route on its east (Montford) and north (Molino) legs and the low-traffic continuation of Montford on its west leg.

a) Aerial

b) Montford westbound approach (note guide sign)

Figure 4-5: Molino Avenue / Montford Avenue Intersection

Observations

The intersection is all-way STOP-controlled. All approaches have STOP word markings and STOP signs with "3-WAY" plaques. Montford's east leg has a continental (ladder rungs) crosswalk marking and a double yellow centerline implemented with raised pavement markers. The north (Molino) leg has a continental (ladder) crosswalk marking and a painted double yellow centerline. Montford's west leg has no crosswalk marking or centerline.

The STOP sign post on Montford's westbound approach has a guide (white on green) sign below with two right-turn destinations: "MOLINO" and "EDGEWOOD."

Analysis

There are two ways to climb between this intersection and the Molino Avenue / Janes Street intersection: (steeper) 0.28 miles via Molino (right turn), or (less steep) 0.5 miles continuing straight on Montford to Janes Street (Focus Area 2). Janes Street is a county road.

Westbound bicyclists would benefit from knowing the Montford-Janes alternate exists, and its comparative length and grade. (One participant noted that bike rental maps do not give good guidance.) Figure 4-6 is a concept based on MUTCD D1-2b and D1-2c bicycle guide signs.

Notes:

a) The evaluator did not obtain the actual grades; the concept's "5%" and "10%" would be replaced with approximate actual grades — either average or maximum.

b) The concept uses "Molino Park" rather than something like "Molino Ave / Janes St intersection" because the common destination (top row) implies that the options rejoin (hence no need for "intersection"), and Molino Park happens to be located there.

Suggestions

Table 4-4: Suggestions for Molino Avenue / Montford Avenue intersection

#	Item	Suggestion
1	Montford westbound approach	Install a bicycle guide sign in advance of the existing guide sign, indicating two ways to reach the Montford / Janes intersection (at Molino Park): Straight (Montford to Janes) 0.5 mi (X% grade) Right turn (Molino) 0.28 mi (Y% grade)

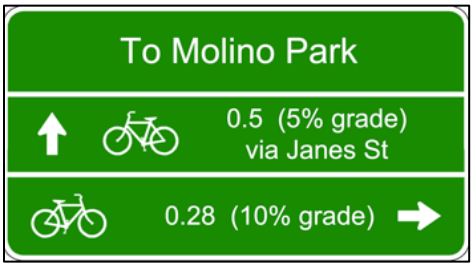


Figure 4-6: Concept for westbound bicycle decision point sign

4.3.2. FOCUS AREA #2: Montford Avenue / Janes Street Alternate Route Segment

Overview

Figure 4-7 shows the two ways that road users can travel between Molino Avenue's intersections with Montford Avenue and Janes Street (the latter is at Molino Park):

a) Via Molino (yellow, 0.28 miles, steeper, fewer and less-sharp curves, moderate-to-high traffic)

b) Via Montford and Janes (orange, 0.5 miles, less steep, low traffic, several low-speed curves)

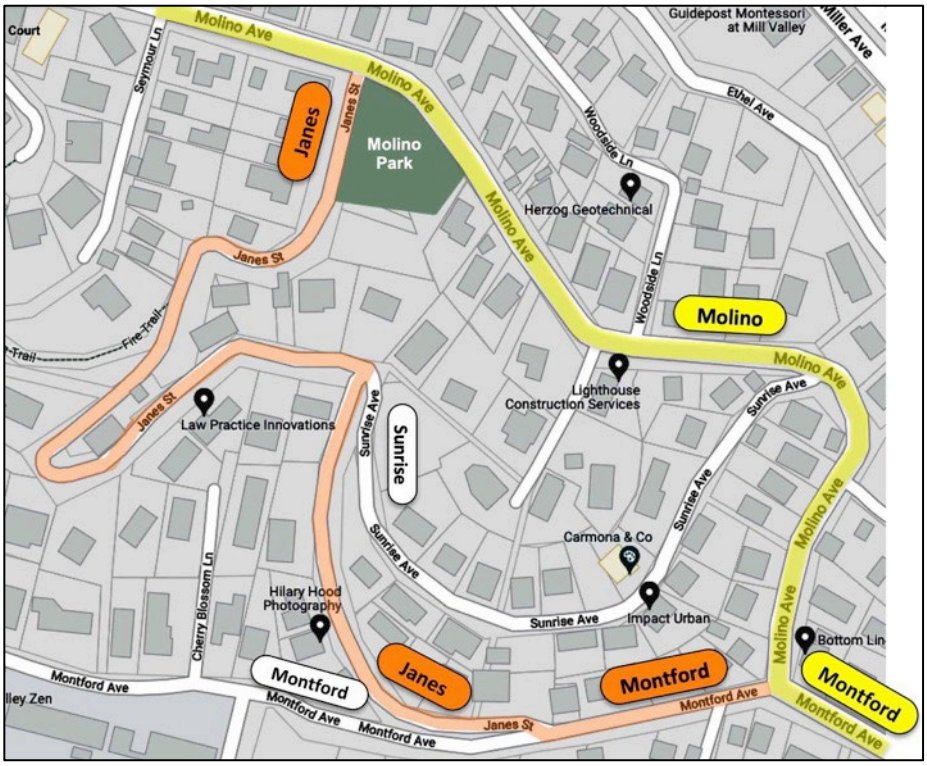


Figure 4-7: Montford Avenue / Janes Street Alternate Route Segment

In Focus Area 1 (Montford / Molino intersection) it is suggested that westbound (ascending) bicyclists be presented with a guide sign that informs them of each option's distance and grade.

Observations

Janes Street, and the short segment of Montford Avenue that connects its eastern end to the Molino / Montford intersection, are low-traffic residential streets with parking on one or both sides and limited sight lines.

Janes Street forks away from Montford toward the north 350' west of that street's intersection with Molino. Janes intersects Sunrise Avenue at a T approximately midway along the alternate route.

Along the entire alternate route segment (Montford from Molino to Janes, Janes to Molino), the north or east side is within the city limit and the opposite side of the street is outside the City limit (i.e., in unincorporated Marin County).

Analysis

Bicyclists (both ascending and descending) who choose the Montford-Janes option to avoid the Molino's steep segment need guidance to keep them on that route through the Janes / Sunrise intersection and at Janes' base intersection (fork) with Montford. At the Sunrise intersection, simple BIKE ROUTE signs with directional arrows would suffice.

Figure 4-8: Janes northbound approach to Sunrise T-intersection

A desirable outcome of signing this alternate bicycle option would be that a larger fraction of bicyclists uses it. If that happens, it could be useful to inform motorists along the Janes segment to expect bicycle traffic, especially around blind curves.

One way to achieve this would be to install Shared Lane Markings (a.k.a. "sharrows"), which would also confirm to bicyclists that they were still on the route. Adding sharrows only in the uphill (westbound) direction should be sufficient because eastbound (descending) bicyclists will generally travel at speeds similar to motor vehicles, so closing speed will be low, and would use the opposite-direction sharrows as route guidance.

During the field audit, one or more of participants wondered whether the narrow, sharply-curving stretch of Janes Street between Sunrise Avenue and Molino Park's south pedestrian entrance (200' from Molino Avenue) could become one-way westbound (uphill) for motorists and two-way for bicyclists, to reduce the volume of downhill motor traffic. Such full one-way operation could be impossible to enforce and impractical for delivery vehicles. An analysis of such a change is beyond the scope of this report, and input from residents would certainly be essential. Perhaps this could be a discussion item for the Bicycle-Pedestrian Advisory Committee.

However, a north-facing sign (informing southbound/eastbound traffic) might be beneficial. It could perhaps read "LOCAL TRAFFIC ONLY", with "EXCEPT BICYCLES" (or a CA MUTCD R118 (CA) "EXCEPT [BIKES]" sign).

Figure 4-9: Janes facing north at Molino Park south entry (end of narrow segment)

Suggestions

Table 4-5: Suggestions for Montford Avenue / Janes Street alternate route segment

#	Location	Item	Suggestion *(Rationale or Notes)*
1	Montford / Janes intersection	Bicycle guide signs	a) Janes EB (downhill) approach: Install D1-1b (single destination, no distance) sign with upward-pointing arrow and destination "Miller Ave." b) Montford WB approach: Install D1-1b sign with up-and-right pointing arrow and destination "Molino Park."
2	Janes / Sunrise intersection		a) Janes WB (uphill) approach: Install D1-1b sign with left-pointing arrow, destination "Molino Park." b) Janes EB (downhill) approach: Install D1-1b sign with right-pointing arrow, destination "Miller Ave."
3	South end of Molino Park	Reducing eastbound motor traffic volume on Janes	Consider whether a north-facing sign just south of (below) Molino Park's driveway (which intersects Janes 200' south of Molino) would be beneficial to both bicyclists and residents, by deterring entry by eastbound motorists bound for Miller Avenue. *The sign could say "LOCAL TRAFFIC ONLY" (EXCEPT BICYCLES)." The Except part could be a CA MUTCD R118 (CA) "EXCEPT [BIKES]" sign.*
4	Full length of Montford-Janes alternate route	Markings	Consider installing Shared Lane Markings ("sharrows") periodically in the climbing direction, spaced so the next one is always visible. *(Inform motorists to expect bicyclists. Keep bicyclists on route.)*

4.3.3. FOCUS AREA #3: Molino Avenue / Janes Street Intersection

Overview

As shown in Figure 4-1, Janes Street meets Molino Avenue (the main route) at an all-way-STOP controlled T-intersection. At this location Janes runs north-south and Molino runs east-west. There is a marked crosswalk on Molino's east leg.

Molino Park occupies the southeast quadrant. Its activity area is at a lower elevation than the two streets. Approximately 200' south on Janes is a pedestrian entrance with a walkway that ramps down into the activity area.

Mill Valley has many designated "Steps, Lanes and Paths" (SLPs). SLP #12, a path that connects to Ethel Avenue via Woodside Lane, ends on the north side of Molino approximately 40' east of the crosswalk.

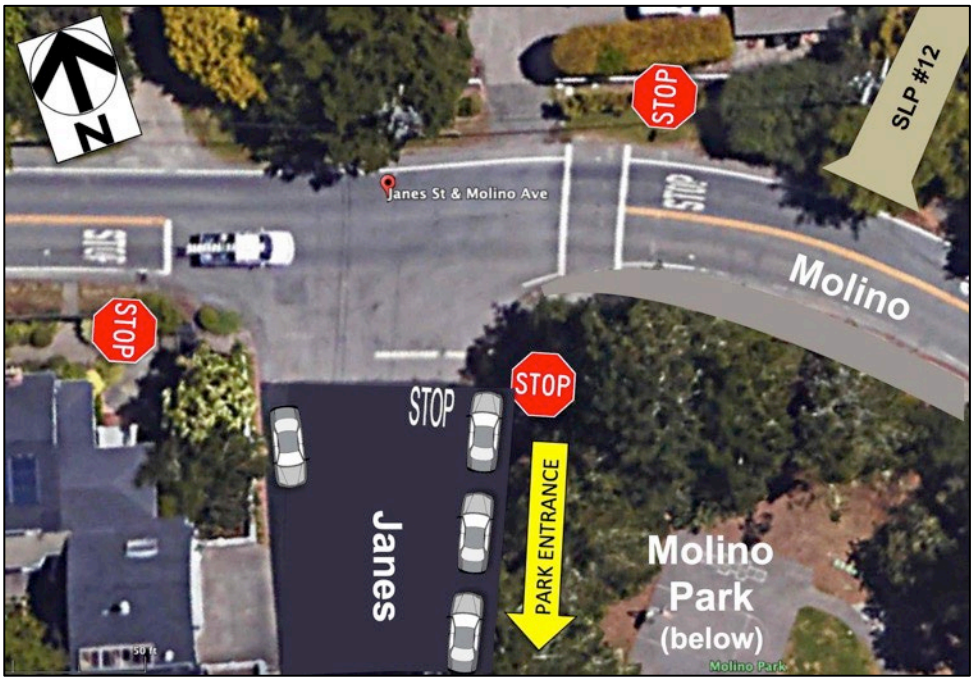


Figure 4-10: Molino Avenue / Janes Street Intersection

Observations

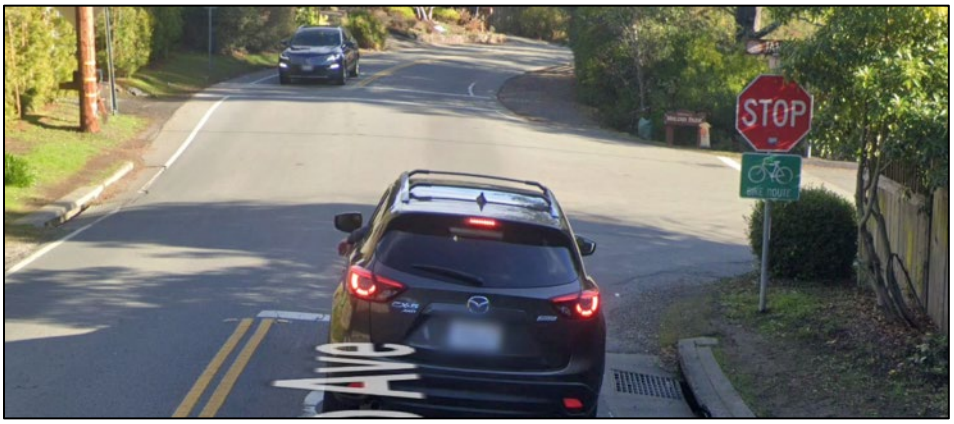
Molino's north shoulder between SLP #12 and the marked crosswalk varies in width and is narrow at one point. A tall hedge extends into the shoulder, effectively narrowing the way for pedestrians.

Molino's south shoulder at the south end of the marked crosswalk is narrow, and there is no exclusive walking area along the east side of Janes Street. Park visitors arriving by vehicle park along that side of Janes, so pedestrians walk in the street between the crosswalk and the park.

The STOP sign on the eastbound approach has a large "BIKE ROUTE" (D11-1) sign mounted below it. This sign assembly obstructs width for pedestrians walking along the south side of

Molino. The BIKE ROUTE sign does not state a destination, so it conveys little useful information to road users. Specifically, it does not inform eastbound bicyclists that they can avoid an upcoming steep section of Molino by turning right and following Janes to Montford. This guide sign also does not need to be mounted on the same post as the STOP sign because it does not supplement the meaning of the STOP sign.

b) Molino westbound (uphill) approach; SLP #12 intersects at right (sign post)



b) Molino eastbound (downhill) approach. Low-mounted sign assembly

c) Facing southeast toward Molino Park. No walkway along east side of Janes Street to park entrance

Figure 4-11: Molino Avenue / Janes Street Intersection

Analysis

Pedestrians traveling along Janes between the intersection and Molino Park's entrance 200' south must walk in the street because cars park along the east side. On that stretch the street appears to be wide enough that east-side parallel parking could potentially be shifted away from the edge and a sidewalk installed. That sidewalk could wrap around the corner to meet the south end of the east leg's marked crosswalk.

Providing a minimum 5' of walking width (preferably wider) along the north side of Molino between SLP #12 and the marked crosswalk would better connect the path with Molino Park and Janes Street. The hedge along this segment should be maintained to provide walking width.

California MUTCD section 2A.18 states that the bottom edge of a sign located "where pedestrians movements are likely to occur" shall be at least 7' above the walking surface. That MUTCD section allows the bottom edge of a "secondary sign" mounted below the main sign to be 1' lower. However, the existing D11-1 BIKE ROUTE sign does not supplement the meaning of the STOP sign, so it does not need to be on the same post.

A D11-1 BIKE ROUTE sign without additional plaques giving destinations or directions provides little useful information to road users. State-of-the-practice D1-series "decision point" bicycle guide signs (example in Focus Area 1) add those useful elements. On the eastbound approach, bicyclists bound for Miller Avenue via Montford Avenue would find it useful to know that if they continue straight on Molino to reach Montford they will traverse a steep downhill grade and if they turn right onto Janes the grade will be gentler though the distance will be longer. A two-destination D1-series sign could convey this. Figure 4-12 shows a concept.

Figure 4-12: Concept for eastbound bicycle decision point sign

Notes:

a) The evaluator did not obtain the actual grades; the concept's "5%" and "10%" would be replaced with approximate actual grades — either average or maximum.

b) The concept uses "Montford Avenue" rather than "Miller Avenue" because the Montford/Janes intersection is the common destination. (Actually the Janes Street option reaches Montford a short distance west of Molino.)

Suggestions

Table 4-6: Suggestions for Molino Avenue / Janes Street intersection

#	Item	Issue	Suggestion
1	Molino eastbound approach	Sign mounting height	Install STOP sign on taller post so its bottom edge is at least 7’ above the walking surface. Remove the D11-1 BIKE ROUTE sign.
2		Bicycle decision point guide sign	In advance of the STOP sign, install a “decision point” bicycle guide sign with directional arrows: • Straight (Molino) 0.25 mi (Y% grade) • Right (Janes) 0.5 mi (X% grade). Ensure that the bottom edge is at least 7’ above the walking surface. See Figure 4-12 for a concept.
3	SLP #12 connection to crosswalk and Molino Park	Encroaching hedge	Trim back the face of the hedge between the SLP and the crosswalk to preserve a wide walking area
4		Pedestrian guide signage	Consider adding guide signs for pedestrians where SLP #12 meets Molino (guidance to Molino Park) and at the pedestrian entrance to Molino Park (guidance to SLP #12).
5	Southeast corner	Walking width	Widen the paved area from the crosswalk to the fire hydrant, for pedestrians
6	East side of Janes Street, to Molino Park entrance 200’ south of intersection	Walkway	Add a sidewalk or protected walkway along the east curb, ideally wide enough that pedestrians can pass by an open car door on the passenger side.

4.3.4. FOCUS AREA #4: Molino Avenue / Edgewood Avenue / Cape Court intersection

Overview

The route to Panoramic Highway proceeds west on Molino Avenue from Janes Street to Cape Court, where Molino turns right onto the north leg (Cape Court is the south leg). The route continues west onto Edgewood Avenue. As shown in Figure 4-13, the intersection is a 90-degree cross except for Molino's east leg, which angles to the south relative to the opposite (Edgewood) leg. The southbound (Molino), eastbound {Edgewood) and northbound (Cape) approaches have STOP signs; Molino's westbound approach does not stop.

Mirabel Avenue tees into Molino from the north approximately 100' east of Cape Court. There the southbound (Mirabel) and westbound Molino approaches have STOP signs; Molino's eastbound approach does not stop.

The west (Edgewood) leg of the main intersection has a marked crosswalk (two white lines). No other legs of either intersection have crosswalk markings,

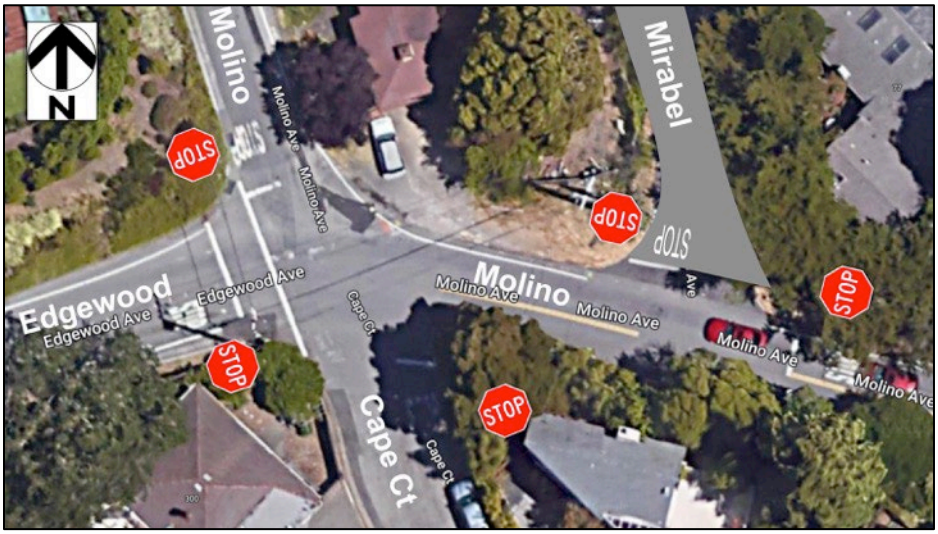


Figure 4-13: Molino / Edgewood / Cape Court / Mirabel Intersection

Observations and Analysis

Centerlines

There are double yellow centerlines on Edgewood and on Molino east of Cape Court. Molino's is painted; Edgewood's uses yellow raised dots that are not as visible as continuous painted or thermoplastic lines, and which are not understood by some motorists to be legally the same as a painted centerline.

As on other segments of the route, the double yellow centerline implemented with raised reflective pavement markers or dots is not as visible as a painted or thermoplastic treatment and may not deter unsafe passing as well as solid lines.

Bicycle guide signs

The westbound route to Panoramic Highway continues onto Edgewood instead of making the soft right turn onto the continuation of Molino. However, there are no bicycle guide signs for the main route in either direction approaching the main intersection. The evaluator rode the entire route in both directions on his e-bike. (Approaching the main intersection westbound on his e-bike, the evaluator mistakenly followed Molino instead of crossing onto Edgewood.)

Bicycle guide signs for both directions of the main route approaching the main intersection could help to keep bicyclists oriented. The eastbound sign could have an up-arrow and the destination "Miller Ave"; the westbound sign could have an up-and-left diagonal arrow (pointing toward Edgewood) and the destination "Panoramic Hwy."

Uncontrolled traffic movements

At the main intersection, the westbound Molino approach does not have a STOP sign, so traffic approaching on that leg can turn right (continuing on Molino), proceed through onto Edgewood, or turn left onto Cape Court. Currently none of the main intersection's other (STOP-controlled) approaches has a plaque warning that westbound Molino traffic does not stop. Some unfamiliar roadway users may assume all-way stop control.

The CA MUTCD defines three plaques for optional mounting below STOP signs in this situation. At the main 4-way intersection the W4-4aP would be appropriate for the Edgewood approach and the W4-4bP for the Cape Court approach. On the Mirabel approach to Molino the W4-4aP with "RIGHT" substituted for "LEFT" would be appropriate.

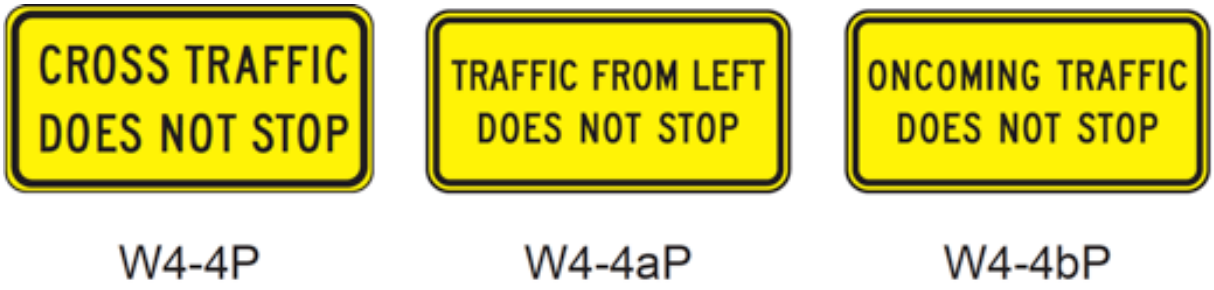


Figure 4-14: Optional plaques for STOP signs where another approach is uncontrolled

Consideration could also be given to installing a STOP sign on the westbound Molino approach, to benefit westbound bicyclists intending to continue through onto Edgewood. Strong and confident bicyclists making that through movement will have "singled up" in line with motor vehicles before reaching the junction, but other bicyclists may have stayed right, along the shoulder stripe, setting themselves up for a "right-hook" cutoff by motorists turning right onto northbound Molino.

Centerline extension

The westbound through movement from Molino onto Edgewood at the main intersection bends to the left. The evaluator speculated whether marking a centerline extension between the west and east legs would enable motorists to bear left more accurately, which in turn could help to assure bicyclists that they could make their through movement safely in parallel.

California Vehicle Code (CVC) section 21752 ("Where Driving on Left Prohibited"), subsection (d) prohibits overtaking (passing) within an intersection, however motorists may not know this also applies to overtaking a bicycle.

Westbound bicycle markings across intersection

Installing a series of Shared Lane Markings ("sharrows") centered in the westbound through movement could help to remind motorists – especially westbound right-turners – that many westbound bicyclists will continue through (across the intersection) onto Edgewood.

Suggestions

Table 4-7: Suggestions for Molino / Edgewood / Cape Court / Mirabel intersections

#	Item	Suggestion	Rationale
1	Double yellow centerline	Replace "raised dots" treatment with solid painted or thermoplastic lines.	Increase motorist compliance with passing prohibitions
2	Bicycle guide signs for main route	Install bicycle guide signs for the major bike route. Eastbound (Edgewood) approach) Up-arrow, destination "Miller Ave" Westbound (Molino) approach: Up-and-left diagonal arrow (toward Edgewood), destination "Panoramic Hwy."	Reduce incidence of westbound bicyclists mistakenly turning right onto the north (Molino) leg
3	Uncontrolled traffic movements	Consider installing W4-4P, W4-4aP or W4-4bP "…Traffic…Does Not Stop" plaques to STOP signs where a conflicting movement does not stop.	Inform unfamiliar road users of uncontrolled conflicting movement
4	Traffic control	Evaluate warrants for a STOP sign on Molino's westbound approach to the main (Edgewood / Cape Court) junction	May reduce "right-hook" conflicts between westbound right-turning motorists and westbound through bicyclists
5	Centerline extension (main intersection)	Consider adding a centerline extension line between the main intersection's west (Edgewood) and east (Molino) legs.	Guide westbound motorists making the "soft left" onto Edgewood. Possibly improve comfort for bicyclists making the same movement in parallel.
6	Markings for westbound bicycle traffic	Consider installing 2 or 3 Shared Lane Markings centered on the westbound through movement through the intersection.	Remind westbound right-turning motorists that same-direction bicyclists will often proceed through onto Edgewood.

NOTE: Because the city limit runs along Edgewood, suggestions for the south side would involve the County of Marin.

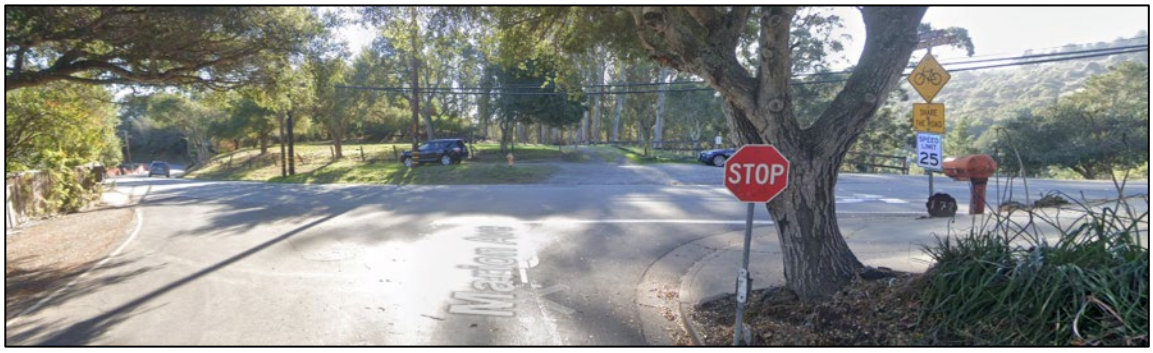
4.3.5. FOCUS AREA #5: Edgewood Avenue / Marion Avenue / Ridgewood Avenue intersection

Overview

Edgewood Avenue continues west from Molino Avenue toward Sequoia Valley Road. The city limit runs along the south side of the road. Just west of Marion Avenue, a W11-1 + W11-15p SHARE THE ROAD warning sign assembly is mounted atop a 25 MPH speed limit sign.

As shown in Figure 4-13, Marion intersects from the north at a STOP sign. Ridgewood Avenue intersects Edgewood from the west-southwest with no traffic control sign (i.e., implied Yield). There is a gravel parking area on its east side at the junction, providing access to an open space area to the south in which the Pixie Trail parallels Edgewood eastward to connect with Cecily Lane and Hart Lane, continuing past Kerouac Hill and Goat Hill to Janes Street. Along the way, trails and spurs connect to Cape Court, Seymour Lane and Montford Avenue.

a) Aerial



b) Marion approach

Figure 4-15: Edgewood / Marion / Ridgewood intersection

Observations and Analysis

Bicycle turnouts

On the north side of Edgewood and Marion Avenue intersection, the wide paved area serves as an informal turnout for westbound bicyclists who have just ascended the grade to the east.

The south side of Edgewood across Ridgewood and along the informal parking area to the east also has the potential to also serve as a bicycle turnout, if a paved shoulder was added along the parking area and striped on both sides. Paving the informal parking area would reduce gravel migration onto Edgewood's eastbound traffic lane and the suggested paved shoulder.

Encouraging motorist-bicyclist coexistence and safe passing of bicyclists

FHWA now discourages installation of the Share The Road sign assembly because its meaning is misinterpreted by roadway users. Section 4.2, subsection "Encouraging safe coexistence…", describes two relevant signs that can be considered instead.

Increasing awareness of pedestrian crossing activity

The open space and its fire roads and trails are strong attractors for pedestrians to cross near Marion Avenue. However, there are currently no pedestrian warning signs to inform Edgewood traffic to expect crossing activity near Marion.

The sightlines to approaching traffic in both directions appear to be best near the east side of Marion. Figure 4-16 shows the combined concepts, detailed in Table 4-8.

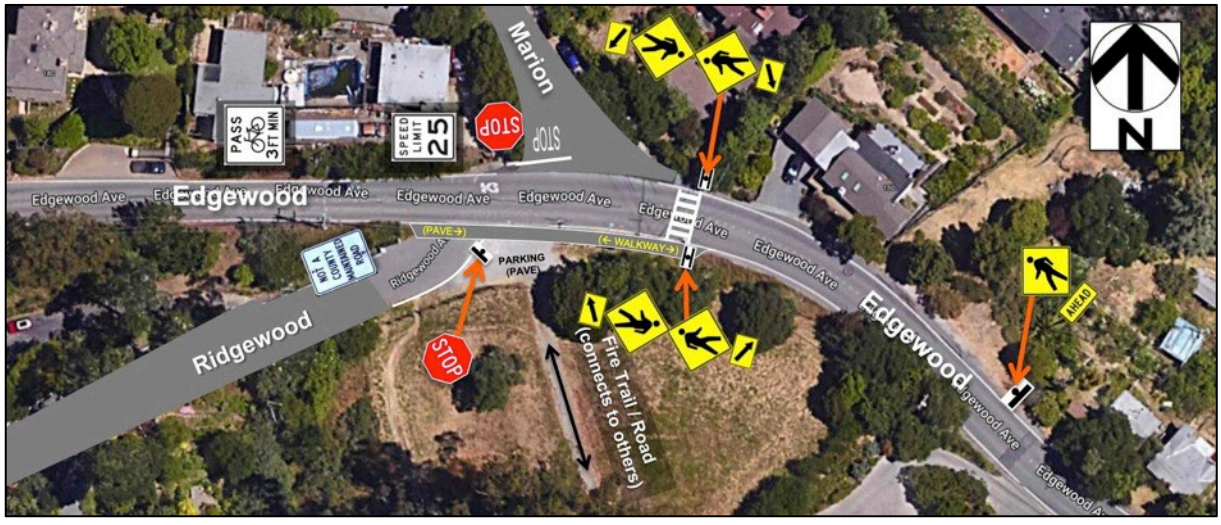


Figure 4-16: Concepts for Edgewood / Marion / Ridgewood intersection

Suggestions

Table 4-8: Suggestions for Edgewood / Marion / Ridgewood intersection

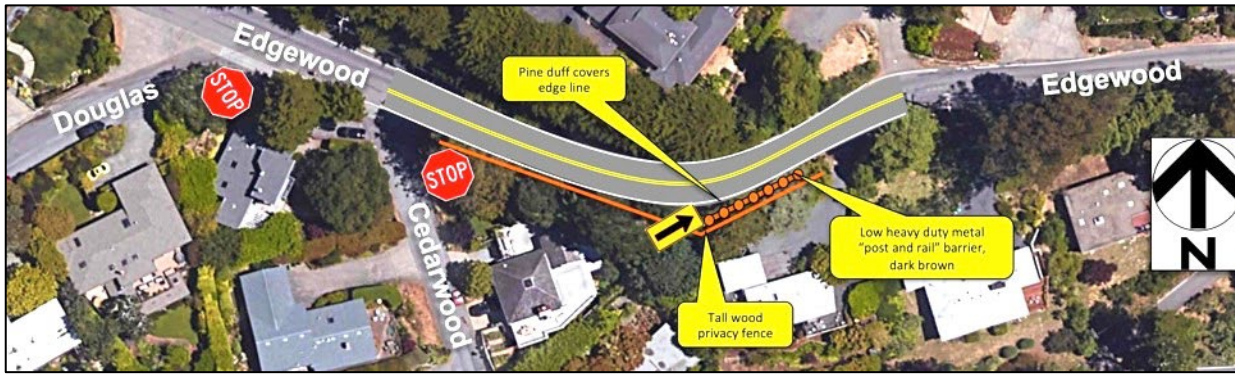
#	Item	Suggestion	Rationale
1	Pedestrian crossing activity at/near Marion	Install 2-sided W11-2 Pedestrian Symbol signs on both sides of Edgewood. Consider placing them at the east side of Marion, where sightlines appear best in both directions.	Inform approaching Edgewood traffic. Indicate crossing location to pedestrians.
2		Consider also installing a 1-sided east-facing sign assembly further east on Edgewood, consisting of a W11-2 with an "AHEAD" plaque.	Inform westbound traffic in advance.
3		Construct a hard-surface walkway along the south side of Edgewood between the desired crossing location and the unpaved parking area aligned with the Fire Trail.	Connect crossing location to south-side open space destination
4		If it is deemed advisable, augment the basic warning sign treatment described above by installing a high-visibility crosswalk marking and adding W16-7p Downward Pointing Arrow plaques to the sign assemblies.	Indicate and highlight specific crossing location
5		If a crosswalk is marked and it is deemed advisable to increase motorist yielding compliance, consider installing pedestrian-activated Rectangular Rapid Flashing Beacon light bars to the warning sign assemblies.	Increase motorist / bicyclist yielding compliance at crosswalk.
6		Install pedestrian guide signage.	Inform about walking route
7	Bicycle turnouts	Consider paving the informal (currently gravel) parking area on the southeast corner at Ridgewood and marking the area to prohibit parking immediately adjacent to Edgewood, so eastbound bicyclists can use the Ridgewood junction and the edge of the parking area as an informal turnout.	Enable eastbound bicyclists to pull out of traffic to rest or to enable passing before continuing east of Marion.
8	Share The Road sign assembly	Consider removing the Share The Road sign assembly currently mounted atop the SPEED LMIT 25 MPH sign. Because the existing STR assembly is at the start of a 400' straight westbound segment, consider replacing it with a R117 (CA) PASS [BIKES] 3 FT MIN sign.	Remove existing ambiguous message. Clearly describe desired behavior for motorists considering passing bicyclists.
9	Ridgewood traffic control	Install a STOP sign on Ridgewood Delineate Ridgewood's east edge to indicate the boundary of the open space parking area.	Clarify motorist guidance including parking movements.

NOTE: Because the city limit runs along Edgewood, suggestions for the south side would involve the County of Marin.

4.3.6. FOCUS AREA #6: Blind curve between Cedarwood Lane and Ridgewood Avenue

Overview

Edgewood Avenue has a blind S-curve between Ridgewood Avenue and Cedarwood Lane, which intersects from the south approximately 60' east of Douglas Drive.



a) Context, including fences and metal barrier along south side of west curve

b) West curve, eastbound approach (W1-6L warning sign)

c) West curve, westbound approach (low metal barrier on south side)

Figure 4-17: Blind curve between Cedarwood and Ridgewood

Observations

Along this segment the County line follows the south side of Edgewood, so south-side suggestions would involve the County of Marin.

The only pavement marking is a yellow centerline formed by pairs of raised reflective markers.

The only warning sign is a single W1-6L One Direction Large Arrow facing the eastbound approach at the start of the north curve.

On the south side of the west curve there is a low metal barrier fence with large-diameter posts and two medium-diameter rails, painted dark brown, along the tall wood fence of 209 Edgewood Avenue. It presumably protects that property's tall wood privacy fence and the house below.

Near the midpoint of the west curve the travel lanes measure approximately 11.5' each. At this location a wide blanket of pine tuff covers the south edge line. On the north side the pavement edge is approximately 9" beyond the edge line and the pavement edge is raveling substantially.

Analysis

If the roadway could be widened enough to add a rideable north shoulder through the blind curve, westbound (uphill) motorists would have much less reason to cross the centerline, and there would be less need to prevent this behavior with raised centerline features such as those discussed in the next subtopic. Because differential speed between motorists and bicyclists in the eastbound (downhill) direction will be significantly lower, a south shoulder is a lower priority.

Preventing crossing the centerline

It is especially dangerous for motorists to attempt to pass a bicyclist within the S-curve, because an oncoming motorist may also be attempting to pass, or an eastbound (downhill) bicyclist may be occupying the entire lane and "apexing" a leftward curve by "straight-lining" close to the centerline. Even centerline rumble strips do not physically prevent crossing the line.

A serpentine concrete barrier or "dike" could do this, but could potentially cause loss-of-control. Several firms now make rounded raised delineators resembling armadillos that -- if mounted properly, on a shallow angle relative to centerline – gently deflect vehicle tires without loss of control. Solid centerline can be striped on either side of the "armadillos", optionally with "rumble" tape for tactile feedback before tires contact the delineators.

Cueing reduced speed, especially downhill

The only speed cue approaching the curve is the centerline, consisting of low reflective markers that wear out, and one W1-6 left-arrow sign on the eastbound approach to the first (west) curve.

Adding a speed pavement marking and/or an advisory speed curve warning sign (potentially for posted 20 mph) could help to set expectations.

A series of 3 to 5 Chevron (W1-8) signs facing eastbound traffic could make the west curve prominent and distinguish it from gentler curves elsewhere along the route.

A W14-3 No Passing Zone sign could reinforce the double-yellow centerline's legal meaning.

Providing a westbound (climbing) shoulder

There may be sufficient total paved width to shift the centerline toward the outside (south) of the west curve, freeing up width for an inside (north) shoulder to benefit ascending bicyclists. Currently both travel lanes are delineated 11.5' wide near the midpoint of the west curve. Evaluation of this possibility is beyond the scope of this report.

Suggestions

Table 4-9: Suggestions for blind curve between Cedarwood and Ridgewood

#	Item	Location	Suggestion
1	Westbound (climbing) shoulder	West curve	Realign centerline to the south to shift width to the north side. Reconstruct north edge and landscape to add a shoulder, as wide as possible and extending as far west as possible. If possible, widen and realign to provide a continuous westbound shoulder at least 4' wide (the minimum width of a bike lane).
2	Signs	Both directions	Consider W14-3 NO PASSING ZONE warning signs at start of first curve in each direction
3		West curve, south side	Install 3 to 5 MUTCD type W1-8 curve warning chevrons on posts behind the low metal barrier, facing eastbound traffic
4		EB before west curve	Install 20 mph advisory speed warning sign assembly before Douglas
5		Barrier	Reflectorize the metal barrier on the south side of the west curve
6	Markings and delineators	Both curves	Install double yellow thermoplastic centerline
7			Consider installing "armadillo" (a.k.a. "zebra") delineators to safely but physically prevent motor vehicles from crossing centerline Consider augmenting with centerline rumble strip tape. Consider augmenting with vertical flexible delineators.
8		Eastbound before Douglas	Add a 25 MPH pavement marking
9		West curve	Periodically remove pine duff to keep the south edge line visible

W1-8 Chevron

W14-3 No Passing Zone

W1-2L +
W13-1p Advisory
Speed Plaque

Figure 4-18: Potential signs for blind curve

Figure 4-19 shows so-called “Armadillo” delineators. The ones shown are made by Cyclehoop / Zicla of recycled plastic, and (according to their website) are available in three metric heights that correspond approximately to 2”, 3.75” and 5”. The photos are of an installation along a same-direction cycle track, which is why both flanking lines are white. The devices are designed to be safely driven over by emergency vehicles.

Figure 4-19: “Armadillo” delineators

Vertical flexible delineators could also be considered to physically prevent crossing centerline.

4.3.7. FOCUS AREA #7: Edgewood Avenue / Douglas Drive intersection

Overview

Douglas Drive is a dead-end street that intersects Edgewood from the south just west of Cedarwood Lane and the S-curve described in Focus Area 6. The junction is very wide. There is no STOP sign. Several car lengths along the east side of the street are posted No Parking Any Time.

On the opposite (north) side of Edgewood, the landscape ground cover along the #234 Edgewood frontage extends to the edge line.

Figure 4-20: Edgewood Avenue / Douglas Drive intersection

Observations and Analysis

The wide apron across Douglas may be used as a turnout by eastbound bicyclists. This could be supported by striping an edge line and a parallel outboard line to the south.

Along the north edge, soil and ground cover extend to the pavement edge. It may be possible to obtain width for a paved shoulder with little grading needed.

Motorists turning right out of Douglas may orient their vehicles at a steep angle relative to Edgewood, requiring a large leftward head-turn to see approaching eastbound traffic including bicyclists. “Squaring up” the approach would reduce the required head-turn angle and so improve detection and recognition of eastbound bicycles. If the squaring-up was achieved with a large island, the island’s east edge could be set back from the existing east edge, creating a protected walkway for residents walking between Douglas and Cedarwood.

Suggestions

Table 4-10: Suggestions for Edgewood Avenue / Douglas Drive intersection

#	Item	Suggestion
1	Markings	Consider marking a bicycle turnout across Douglas (also useable by walkers) using parallel white lines.
2		"Square up" the Douglas approach by adding a wide triangular island on the east side, with an east-edge gap to create a protected walkway to Cedarwood Lane.
3		Install a STOP pavement marking on the realigned approach
4	Signs	Install a STOP sign at the new outer line
5	North edge	Consider cutting back soil and landscape to create width for a paved shoulder usable by bicyclists and walkers. Consider providing drainage at this location.

Figure 4-21: Edgewood Avenue / Douglas Drive Intersection – Concept

4.3.8. FOCUS AREA #8: Edgewood Avenue / Sequoia Valley Road Intersection

Overview

The route continues west on Edgewood Avenue to its intersection with Sequoia Valley Road, then follows that road to Panoramic Highway. Edgewood continues west from the intersection for 1.2 miles, meandering along the southwestern city limit before ending at a Pipeline Trail trailhead.

The Dipsea Trail, the route of a popular annual footrace between Mill Valley and the Pacific Ocean at Stinson Beach, crosses Edgewood's minor leg on a marked controlled crosswalk and continues westward along Sequoia Valley Road until the first curve, where it diverges onto its own alignment to Bayview Drive, its connection to Panoramic Highway and Muir Woods.

The intersection is four-way, with effectively two-way STOP control (the private driveway leg has neither a STOP nor YIELD sign). The legs do not align with cardinal compass points, however this section will use the convention that Edgewood is on the north (minor) and east (major) legs, Sequoia Valley Road on the west leg, and the unnamed private driveway serving at least five homes is the south leg. The angled driveway of #601 Sequoia Valley Road intersects from the south a short distance to the west. The open space on the south side has an informal trail that begins at the southwest corner of the pavement and extends to Douglas Drive.

The west leg of the intersection (Sequoia Valley Rd) angles downward away from the intersection. The north leg (Edgewood) is approximately level. The south leg (private driveway) angles upward substantially. Those three legs have essentially straight horizontal alignments (the driveway curves but not sharply). The east leg (Edgewood) slopes down away from the intersection and also curves toward the south.

Figure 4-22: Edgewood Avenue / Sequoia Valley Road Intersection

Observations and Analysis

Making it safer for pedestrians to cross:

Pedestrians cross at this intersection to access nearby residences, the Dipsea Trail and Edgewood's connection to the Pipeline Trail on the north side, and the open space and trail on the south side. As such, signing and perhaps marking a preferred crossing location would be beneficial. Because of the east leg's horizontal and vertical curvature and the presence of a stone wall near the southeast corner, the west leg appears preferable because it would maximize sight distance for westbound traffic.

Sign assemblies at the crossing would be the W11-2 Pedestrian Symbol atop a W16-7p Downward Pointing Arrow plaque, preferably double-sided to maximize recognition by approaching motorists, with sign posts incorporating yellow retroreflector strips.

Advance warning sign assemblies (W11-2 with W16-9p AHEAD plaque) could further increase driver awareness, especially on the westbound approach where curvature limits sight lines.

Markings would include a high-visibility “ladder” crosswalk and potentially also shoulder markings to guide turning motorists and to define informal turnout areas for bicyclists.

A south-side curb extension would shorten the crossing, give northbound pedestrians a protected and visible place to make a safe crossing decision, and prevent high-speed eastbound right turns into the south leg (private driveway).

Sign assembly on southeast corner (deer crossing, city limit, speed limit):

A west-facing sign assembly is adjacent to the southeast corner property’s stone wall. It consists of a W11-3 Deer Crossing warning sign, a white-on-brown city limit sign, “SPEED CHECKED BY RADAR” word message plaque, and a SPEED LIMIT 25 sign. Its combined area obstructs the sight line to the east (to approaching westbound / uphill traffic) for pedestrians preparing to cross northbound. The sign post is also angled inward toward the roadway.

Figure 4-23: West-facing sign assembly on southeast corner

Only the city limit sign has a strong reason to be at this specific location. Its size is adequate because it is not safety related, and small enough not to block the sight line.

The speed limit sign might be more effective for cueing reduced speed for improved pedestrian crossing safety if it was relocated upstream to near the start of the straight segment where the intersection comes into view.

The Deer Crossing sign could also be placed far enough upstream of the intersection that it does not detract from awareness of the pedestrian crossing location.

Suggestions

Table 4-11: Suggestions for Edgewood Avenue / Sequoia Valley Road intersection

#	Item	Suggestion
1	Westbound lane alignment	To create width for a center median, shift the westbound lane 4'-6' to the north across the intersection and for a short distance beyond (into what is currently a wide shoulder with parking prohibited).
2	Bicycle turnouts	Mark bicycle turnouts across the intersection, outboard of the eastbound and westbound vehicle travel paths, using dashed lines.
3	South curb extension	Install a curb extension on the west side of the wide private driveway to force lower-speed eastbound right turns into that driveway. Keep it clear of the prolongation of #601's house driveway. This will also shorten the crossing distance and provide a protected and visible location for northbound pedestrians to make a safe crossing decision.
4	Crosswalk and associated warning signs	a) Add a painted median on the west leg, with a refuge island on its east side large enough to protect a standard-size W11-2 sign (4' or wider). Dash the inner lines of the painted median west of the crosswalk to permit westbound left turns into the driveway of #601.
		b) Mark a high-visibility ("ladder") crosswalk
		c) Install double-sided crosswalk warning sign assemblies (W11-2 Pedestrian Symbol & W16-7p Downward Pointing Arrow). The "walker" symbols on the left-side signs should preferably "walk" "into" the street.
		d) Install advance warning sign assemblies on both uncontrolled approaches, each consisting of a W11-2 Pedestrian Symbol sign and an "AHEAD" plaque. The one on the westbound (uphill) approach should be far enough upstream (to the east) that the warning signs at the crosswalk are not yet visible.
		e) Consider an always-flashing yellow LED border on the east sign.
5	Southeast corner sign assembly (deer, city limit, speed limit 25)	To unblock the eastward sight line on the south side, relocate the deer warning and speed limit signs further west, possibly to near the start of the straight segment. *(NOTE: To reduce visual clutter, the potential locations of those signs are not shown in the concept figure.)*
		b) Retain the city limit sign in its current location.
		c) Straighten the sign post

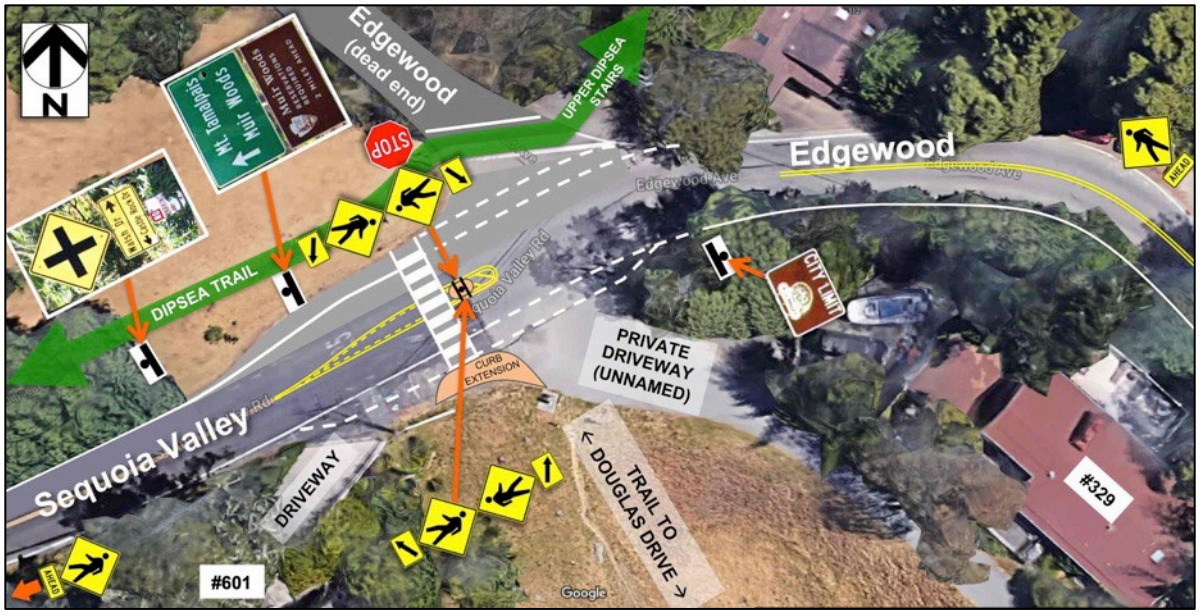


Figure 4-24: Edgewood Avenue / Sequoia Valley Road intersection -- concept

4.3.9. FOCUS AREA #9: Alternate bicycle routes to Edgewood Avenue and Sequoia Valley Road

Overview

Several other street routes are available to bicyclists traveling between Miller Avenue and Panoramic Highway who wish to avoid part of the Montford – Molino – Edgewood portion of the main route. These include:

- Montford Avenue to Janes Street (Focus Area 2)
- Ethel Avenue to Mirabel Avenue to Molino Avenue, rejoining the main route just east of Edgewood
- Cascade Drive (from Throckmorton Avenue) to Molino Avenue to Wildomar Street
- Cascade Drive (from Throckmorton Avenue) to Marion Avenue to Daffodil Lane

Some are identified on the Marin County Bicycle Coalition's countywide bicycle map. Also, some candidates include steep segments and so may only be attractive to downhill riders (or uphill "Billy Goat" riders seeking a challenge).

Analysis

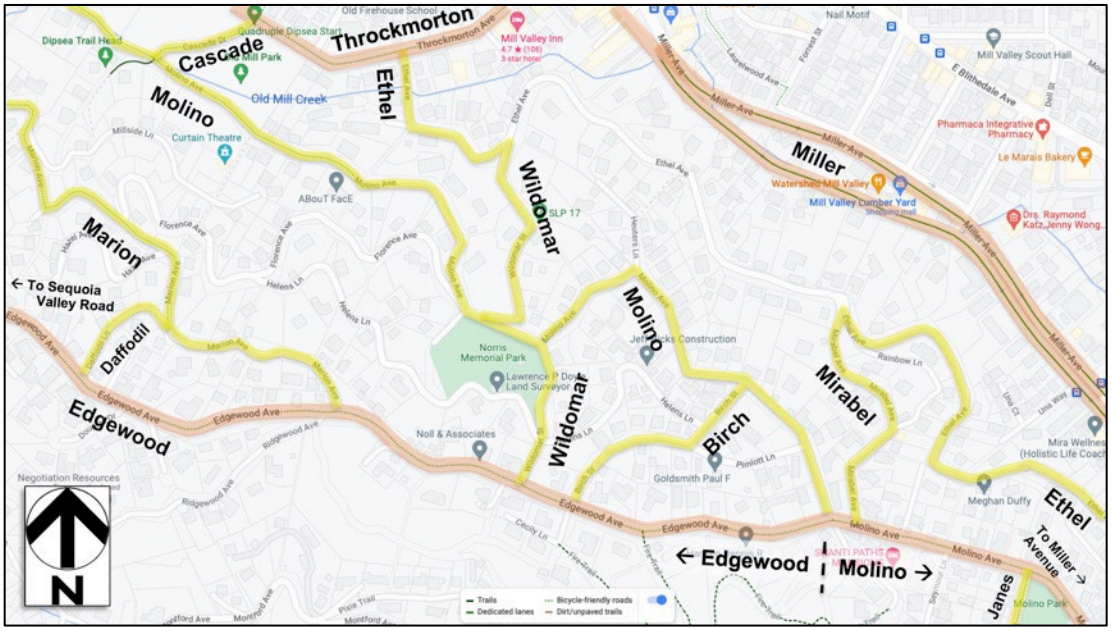
Every bicyclist who chooses an alternate removes conflict volume from the main route. However, these existing alternatives may not be easily discoverable (or follow-able) by unfamiliar bicyclists who do not have a paper or digital map handy.

Adding guidance signs and markings could help with discovery and promote use.

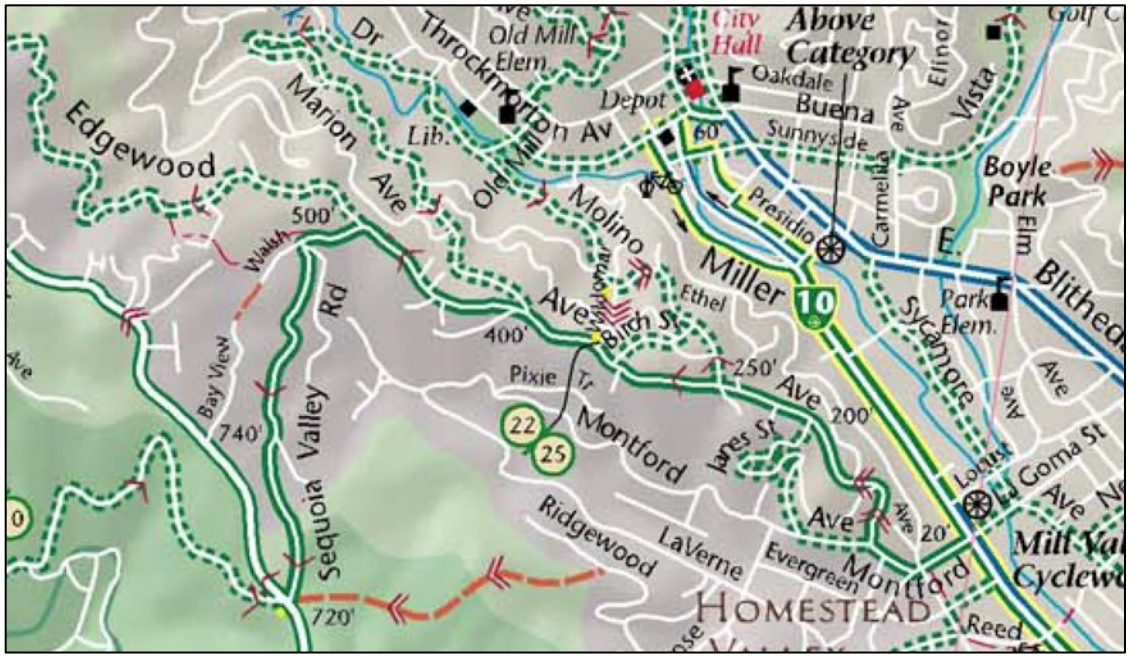
Suggestions

Table 4-12: Suggestions for alternate routes to Molino and Edgewood portions

#	Item	Suggestion	Rationale
1	Designation	With input from residents, BPAC and Marin County Bicycle Coalition, decide which alternate routes will be signed and marked	Not every alternate needs to be included.
2	Signs	Install D1-series bicycle guide signs with distances, directions, and optionally distances, at the lower and upper intersections of each alternate and at every intersection along them.	Help bicyclists discover what is available. Help to avoid getting lost.
3	Markings	Consider using Shared Lane Markings ("sharrows") to further indicate the alternate routes. Marking only in the uphill direction should be sufficient. Space markings closely enough that the next is always visible, especially at intersections.	Inform motorists to expect more bicyclists than they otherwise might, on a given segment. Help bicyclists stay on-route.



a) Google Maps base



b) Marin County bike map excerpt

Figure 4-25: Alternate routes to Molino and Edgewood Segments of Main Route

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- Community Pedestrian and Bicycle Safety Program
- Complete Streets Safety Assessments
- Global Road Safety
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Berkeley Safe Transportation Research and Education Center

safetrec@berkeley.edu

www.safetrec.berkeley.edu