# 2013 West Sacramento Bicycle, Pedestrian, and Trails Master Plan – *Draft*



*Making West Sacramento a bicycle- and pedestrian- friendly community...*

***February 2013***

Caltrans

Transportation Planning
Grant Program

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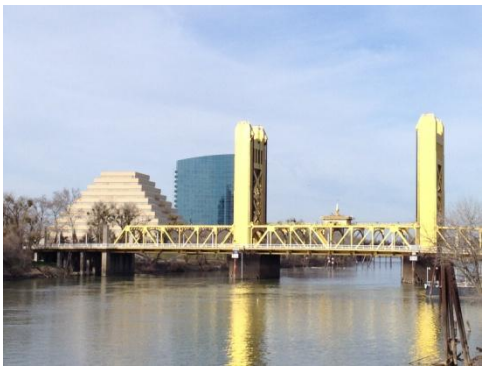
# CHAPTER 1. INTRODUCTION

## VISION

The City of West Sacramento's vision is to be one of the United States' top bicycle- and pedestrian- friendly communities. By being a bicycle- and pedestrian-friendly community, residents and visitors of all ages and abilities will be able to complete many types of trips by bicycling and walking, including trips to school, to work, for errands or for recreation.



Tower Bridge, the Ziggurat Building, and the CALSTRS building in West Sacramento

This vision will be put to action by improving infrastructure for bicycling and walking and by capitalizing on several of West Sacramento's positive characteristics. The City has dense, urban redevelopment areas where bicycling and walking are convenient forms of transportation. Its terrain and mild weather are conducive to bicycling and walking. The City features several opportunity corridors for high-quality bike paths along its rivers and canals. Finally, West Sacramento has regional connections to the cities of Sacramento and Davis, both of which are official Bicycle Friendly Communities according to the League of American Bicyclists.

## PURPOSE

Throughout West Sacramento, the State of California, and the United States, the number of people bicycling and walking for both utilitarian and recreational purposes continues to grow. To encourage the role of bicycling and walking as viable modes of transportation, West Sacramento strives to provide well-maintained facilities that promote public use. The *Bicycle, Pedestrian, and Trails Master Plan* (BPTMP) seeks to further promote bicycling and walking as practical modes of transportation within the community by laying out an updated vision of connected bikeways, walkways, and trails that link together the neighborhoods, places of employment, shopping centers, parks, and schools.

Bicycling and walking are low-cost, non-polluting, sustainable, healthy, and fun forms of transportation ideal for many different types of trips and many different members of the community. The success of this BPTMP will depend upon the community; both to continue their involvement and interest long after the release of the document, and also to develop awareness that bicyclists, pedestrians, and drivers share the

roadway as equally legitimate users. The ultimate goal of the BPTMP is to increase the number of people in West Sacramento who bicycle or walk to work, to school, for errands, or for recreation.

## BENEFITS

West Sacramento's climate and topography increase the attractiveness of bicycling, walking, and recreational trail use within the City. The level terrain, combined with its abundant sunshine, low levels of precipitation, and relatively dense land use pattern help make bicycling and walking viable transportation options and recreational activities year-round.

River Walk Park

Bicycling and walking have several noteworthy benefits including:

- Providing cardiovascular exercise for people of all ages, improving their health and well-being, and reducing health care costs.
- Reduced air pollution and the consumption of non-renewable resources by replacing automobile trips with bicycling and walking trips.
- Enjoyment for the whole family – all ages and experience levels can participate.
- Reduced transportation costs.
- Reduced traffic – bicycling and walking are viable alternatives for many short trips, including trips to work or the store.

## BACKGROUND

According to the California Streets and Highways Code, Sections 891.2 and 891.4, local agencies must complete a bicycle transportation plan to qualify for grant funds issued by the California Department of Transportation through the Bicycle Transportation Account (BTA), and that plan must be no more than five years old. Conforming plans must also contain the minimum 11 key elements as shown in Table 1. West Sacramento's first bicycle transportation plan, the Bicycle and Pedestrian Path Master Plan, was originally developed in 1991. That plan was most recently updated in 1995. Therefore, due to the age of the plan, it no longer qualifies the City for BTA funding. This updated BPTMP contains all 11 key elements, and will once again qualify West Sacramento to receive BTA grant funds.

The BPTMP establishes goals, policies, implementation actions, and priorities for the development of bicycling and walking facilities in West Sacramento, as envisioned by the General Plan. Key elements of the BPTMP include maps of existing and proposed bicycle facilities and their proximity to major activity centers. The implementation plan identifies project priorities, locations, improvement descriptions, facility types, and cost estimates. The implementation plan will guide development of the proposed improvements.

The bicycle component of this BPTMP includes each of the 11 key elements required by the Bicycle Transportation Act. Table 1 shows the BPTMP section or figure that addresses each element.

**TABLE 1**
**CALIFORNIA BICYCLE TRANSPORTATION ACT (BTA) REQUIRED ELEMENTS**

| Required Bicycle Transportation Plan Elements | Location Addressed within the BPTMP |
|---|---|
| A. Estimated number of existing and future bicycle commuters | Chapter 4, Page 37 |
| B. Map and description of land use and settlement patterns | Chapter 4, Page 30<br>Figure 6, Page 33 |
| C. Map and description of existing and proposed bikeways | Figure 3, Page 26<br>Figure 10, Page 45 |
| D. Map and description of bicycle parking facilities | Chapter 4, Page 29<br>Figure 8, Page 36 |
| E. Map and description of multimodal connections | Chapter 4, Page 29<br>Figure 5, Page 32 |
| F. Map and description of facilities for changing and storing clothes and equipment | Chapter 4, Page 29 |
| G. Description of bicycle safety and education programs | Chapter 8, Page 67 |
| H. Description of citizen and community participation | Chapter 1, Page 15 |
| I. Description of consistency with transportation, air quality, and energy conservation plans | Chapter 2, Page 19 |
| J. Description of proposed bicycle projects and implementation priority | Chapter 5, Page 45<br>Chapter 9, Page 74<br>Appendix A |
| K. Description of past expenditures and future financial needs for bicycle facilities | Chapter 4, Page 28<br>Chapter 9, Page 73 |

Source: Fehr & Peers, 2013

# SETTING

One of the primary cities in Yolo County and the Sacramento metropolitan area, the City of West Sacramento lies directly across the Sacramento River from the City of Sacramento. The Sacramento River forms the City's northern and eastern border. To the west, the City is bounded by the Deep Water Ship Channel and the Yolo Bypass Wildlife Area. The City's southern border is the Shangri-La Slough south of Fisher Avenue. West Sacramento's major growth area, Southport, is the incorporated city south of the Deep Water Ship Channel. Figure 1 shows the West Sacramento city limits and the study area for the BPTMP.

As of 2012, West Sacramento's population is 49,300. West Sacramento includes a diversity of land uses. Residential uses range from high density in the Bridge District and the Washington Specific Plan area, to medium density in the north part of Southport, to rural low density in Southport south of Davis Road. Commercial land uses range from neighborhood commercial uses such as those on West Capitol Avenue at Jefferson Boulevard to regional commercial centers such as Riverpoint, which includes Ikea, Wal-Mart, and The Home Depot. The City has a significant industrial area that largely serves the Port of West Sacramento.

Recent redevelopment in the Washington Specific Plan area

Regional automobile transportation is accommodated via Interstate 80 (I 80), the Capital City Freeway (US 50), and California State Route 84 (SR 84). West Sacramento is connected to Sacramento via four bridges over the Sacramento River: the I 80 bridge, the I Street Bridge, Tower Bridge, and Pioneer Bridge (the Capital City Freeway bridge).

The I Street Bridge

Bridges over the Deep Water Ship Channel at Lake Washington Boulevard and Jefferson Boulevard connect Southport to the northern portion of the City.

Regional bicycle travel generally occurs between West Sacramento and Sacramento; this includes a significant demand for commuter and recreational travel between Davis and Sacramento. Most Davis to Sacramento commuters use

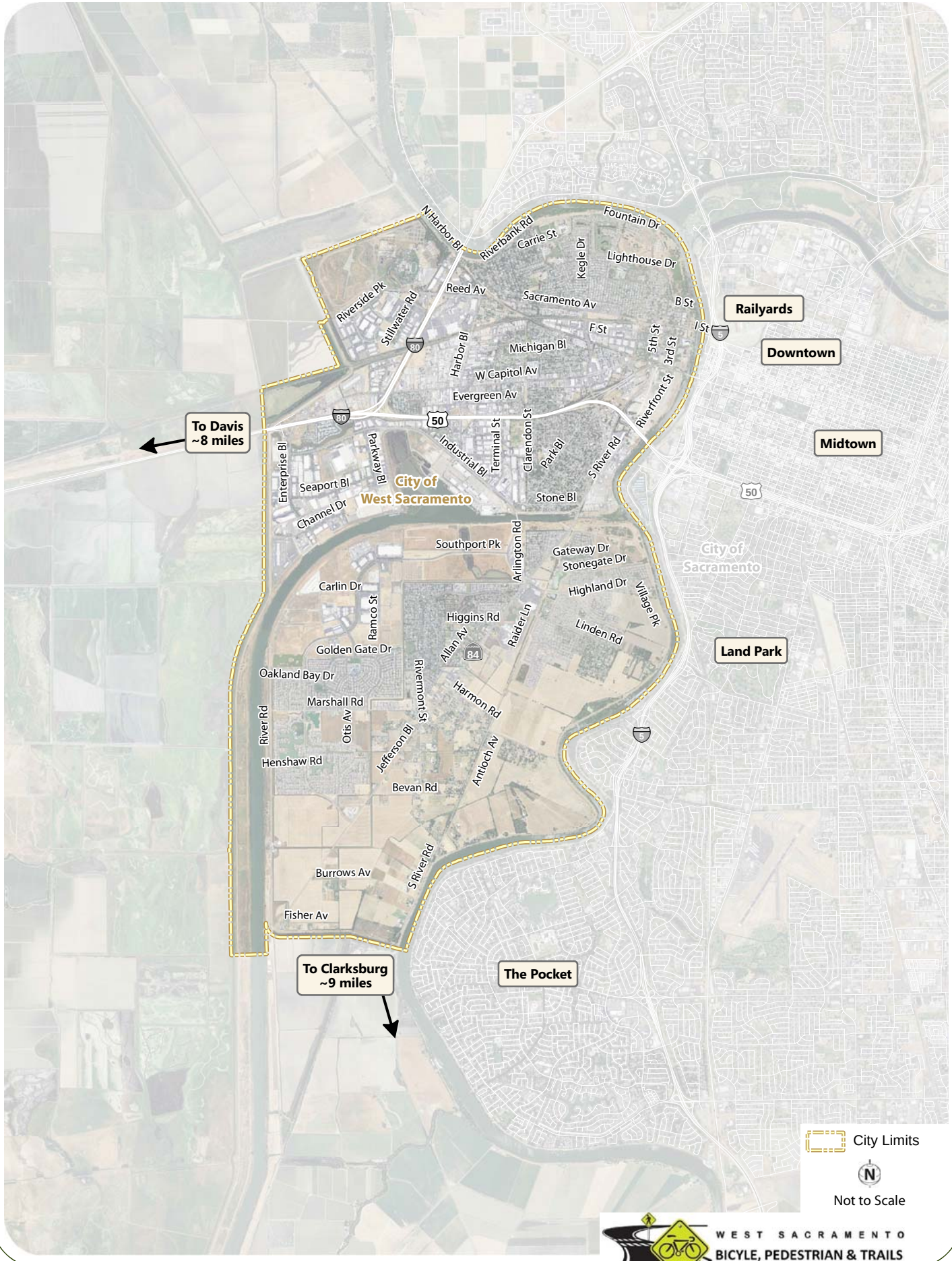
The Clarksburg Branch Line Trail

the bike path on the Yolo Causeway and pass through West Sacramento on West Capitol Avenue, Tower Bridge Gateway, and Tower Bridge. The City owns the entire ten mile length of the Clarksburg Branch Line abandoned railroad right-of-way between the Deep Water Ship Channel and Clarksburg in unincorporated Yolo County. Within the City limits, this right-of-way forms the Clarksburg Branch Line Trail.

West Sacramento's topography and climate are generally conducive to bicycling and walking. The terrain is almost entirely flat and the City only receives approximately 18 inches of rain per year on average. However, hot summer days can make bicycling and walking uncomfortable.

Many of West Sacramento's transportation facilities and nearby waterways pose barriers to bicycling and walking; however, some also provide opportunities for bicycle facilities. Figure 2 shows barriers and opportunities in West Sacramento.

# Figure 1 - Study Area



# Figure 2 - Barriers & Opportunities

# BICYCLE FACILITIES

Bicycle facilities can be classified into two types:

- Bikeways – facilities provided for bicycle travel
- Support Facilities – facilities for use by bicyclists while en route or once they have reached their destination

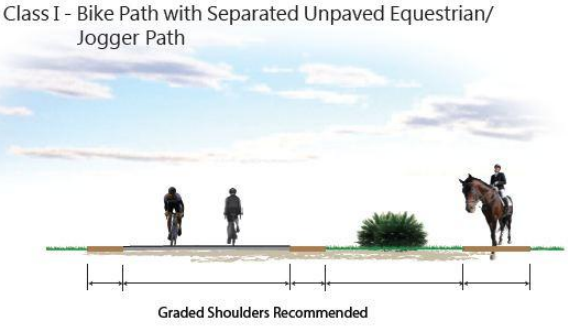
## BIKEWAYS

The *Guide for the Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials [AASHTO], 2012) and Chapter 1000 of the *Highway Design Manual* (Caltrans, 2012) identify three primary types of bikeways: Class I Bike Paths, Class II Bike Lanes, and Class III Bike Routes.

### *Bike Path or Shared Use Path (Class I Bikeway)*

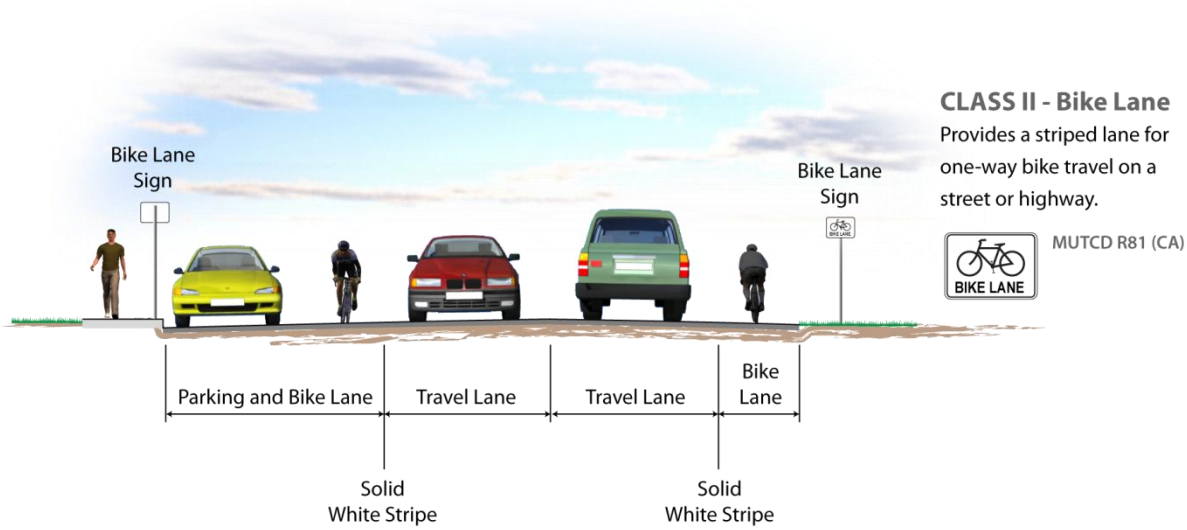
Off-street bike paths are facilities for use exclusively by bicycles, pedestrians, equestrians, and other non-motorized users, with minimal cross-flow by motor vehicles. They are almost always located in an exclusive right-of-way.





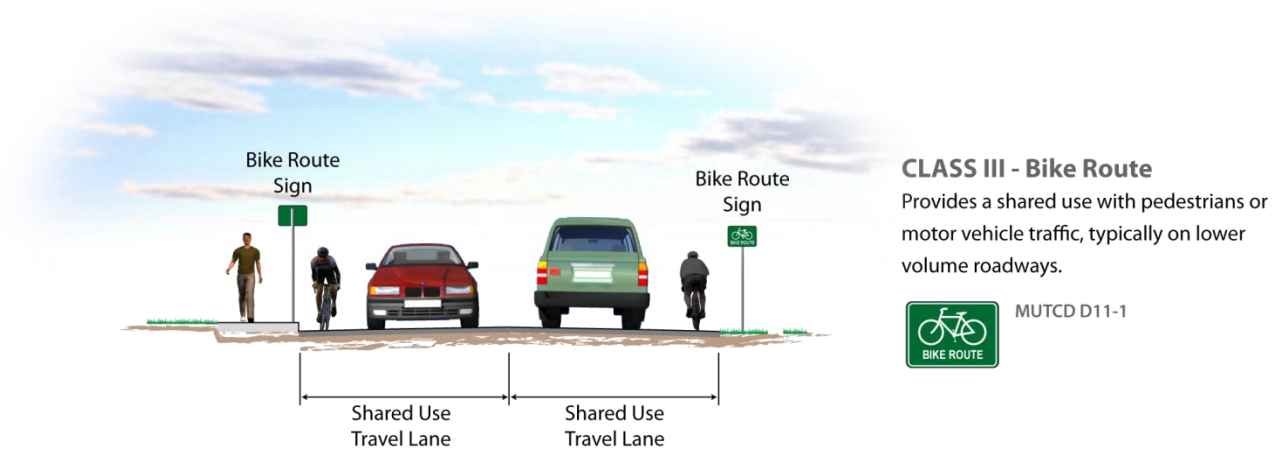
*Bike Lane (Class II Bikeway)*

Bike lanes are areas within paved streets that are identified with striping, stencils, and signs for preferential (semi-exclusive) bicycle use.




*Bike Route or Shared Roadways (Class III Bikeway)*

Shared roadways are on-street routes intended to provide continuity to the bikeway system. Bike routes are designated by signs or permanent marking and are shared by motorists. Many bike routes provide shoulders that can be used by bicyclists or pedestrians.




Chapter 4, Existing Bikeways and Trails, discusses the locations of these types of bikeways in West Sacramento.

## INNOVATIVE BIKEWAYS

The *NACTO Urban Bikeway Design Guide* (National Association of City Transportation Officials [NACTO], 2012) includes design guidance for a standardized set of treatments for world-class bicycling streets in the United States. Several of these treatments can be implemented at present time per the *California Manual on Uniform Traffic Control Devices* (CAMUTCD) (Caltrans, 2012). *The NACTO Urban Bikeway Design Guide* includes design guidance for a variety of bike lanes, cycle tracks, intersection enhancements, signal enhancements, signing and marking enhancements, and bicycle boulevards.

## SUPPORT FACILITIES

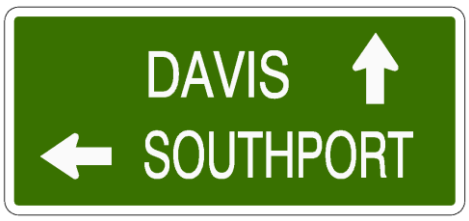
Support facilities include Class I bike path amenities, directional signage, bicycle parking, shower and changing space, and secure storage for bicycle gear.

### *Class I Bike Path Amenities*

Amenities on Class I bike paths include lighting, location and directional signage, and resting locations including benches, water fountains, and restrooms.

### *Directional Signage*

Directional signage can be used on all types of bikeways to direct bicyclists to other bikeways and major destinations, such as schools or major retail centers. Best-practices for directional signage design specifies that signage convey direction, destination, and distance.


### *Short-Term Bicycle Parking*

Short-term bicycle parking is typically provided via bike racks and is usually used when cyclists park their bikes for a couple of hours or less.

Short-term bike parking at Alyce Norman Bryte Playfields

### *Long-Term Bicycle Parking*

Long-term bicycle parking is typically provided at major employment sites, schools, and transportation terminals in the form of bike lockers, bike cages, or bike rooms. Because access is limited to users, these facilities provide higher security, allowing bicyclists to feel comfortable leaving bicycles for long periods of time. Building owners/managers often regulate long-term parking and issue keys to bike cages or bike rooms. Alternatively, electronic bicycle lockers offer a keyless option allowing a user to pay for secure parking time.

Long-term bike parking at City Hall

### *Shower and Locker Facilities*

People are more likely to commute to work on bicycles if they have convenient access to showers and lockers; these facilities assist in encouraging regular commuting via bicycle. Shower and locker facilities are typically implemented as a component of new commercial building construction, and managed by the building owner/manager; they are rarely publicly owned and operated.

## LOW-STRESS BICYCLING

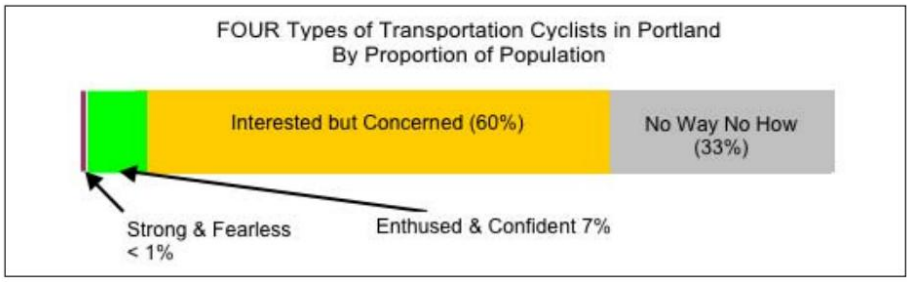
Fehr & Peers analyzed existing and proposed bikeways using the methodology presented in *Low-Stress Bicycling and Network Connectivity* (Furth, Mekuria, and Nixon, 2012). The *Low-Stress Bicycling and Network Connectivity* methodology determines the Level of Traffic Stress (LTS) for roadway segments, intersection approaches, and roadway crossings; for planning purposes, only the roadway segment methodology was used. For roadway segments, LTS is primarily affected by the number of vehicle lanes, presence of a bike lane, vehicle speed limit, presence of a parking lane, and presence of a raised median. Table 2 shows the four-level classification of LTS.

**TABLE 2**
**LEVEL OF TRAFFIC STRESS DEFINITIONS**

| Level of Traffic Stress (LTS) | Definition |
|---|---|
| LTS 1 | Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride. Suitable for all cyclists, including children trained to safely cross intersections. |
| LTS 2 | Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. |
| LTS 3 | More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. |
| LTS 4 | A level of stress beyond LTS 3. |

Source: *Low-Stress Bicycling and Network Connectivity*

The *Low-Stress Bicycling and Network Connectivity* methodology corresponds LTS to the Four Types of Transportations Cyclists in Portland, a chart developed by Portland's Bicycle Program Manager, Roger Geller.




Source: Roger Geller

The above chart shows that "Interested but Concerned" bicyclists comprise the majority of adults. The *Low-Stress Bicycling and Network Connectivity* methodology concludes that "Interested but Concerned" bicyclists will not tolerate a LTS greater than two. Therefore, significantly increasing bicycle mode share will require the construction of well-connected bikeways with a LTS of two or less. For the purposes of this plan, bikeways are considered low-stress if they have a LTS of one or two. The following bike facilities qualify as LTS two or less:

- Bike paths
- Bike lanes on streets with up to four lanes (total) and a speed limit of up to 30 miles per hour (35 miles per hour if a raised median is present)

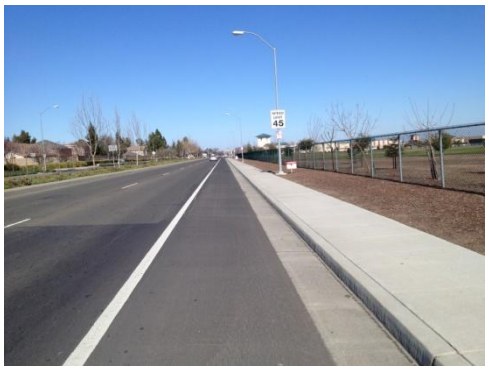
- Shared streets (or bike routes) with up to three lanes (total) and a speed limit of up to 25 miles per hour

## PEDESTRIAN FACILITIES

Common pedestrian facilities include sidewalks, marked crosswalks, and curb ramps. There are several different types of crosswalk enhancements that aim to improve safety for pedestrians.

### SIDEWALKS

There are two types of sidewalks: adjacent and separated.



Adjacent sidewalks are next to vehicle lanes

Separated sidewalks are separated from vehicle lanes by a landscaped buffer

### CROSSWALKS

*California Vehicle Code* (CVC) (California Department of Motor Vehicles, 2013) Section 275 defines a crosswalk as either "that portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections" or "any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings". So, legal unmarked crossings are those at intersections defined by the prolongation of sidewalk areas.

Controlled, marked crosswalk with triple-four marking pattern

Marked crosswalks feature striping and other enhancements to delineate a street crossing for pedestrians. There are two types of crosswalks: controlled and uncontrolled. At uncontrolled

crosswalks, drivers are legally required to yield to pedestrians, but do not have to stop when a pedestrian is not present. Controlled crosswalks are located at intersections with stop signs or traffic signals. Pedestrians should exhibit caution whenever crossing the street, regardless of if the crosswalk is unmarked, marked, controlled, or uncontrolled.

### CURB RAMPS

Curb ramps provide wheelchair access to sidewalks. The yellow truncated domes alert visually impaired pedestrians as they approach a street crossing.

Curb ramp with yellow truncated domes

## RULES OF THE ROAD

### FOR BICYCLISTS

The *California Vehicle Code* Division 11 contains the rules and regulations for operating a bicycle, commencing with Section 21200 through 21212. The CVC does not define bicycles as vehicles, but states that persons riding bicycles have the same rights and responsibilities as the drivers of vehicles. This means that bicycle riders must follow the basic traffic laws that all drivers follow, including but not limited to the following:

- *Ride on the right side of the roadway*
- *Obey traffic control devices (signs, signals)*
- *Yield to cross traffic*
- *Yield when changing lanes*
- *Yield to pedestrians in crosswalks*
- *Maintain speed positioning – the general principle is that the slowest traffic stays right. Bicycles are typically slower than auto traffic and are therefore usually found on the right side of the road (or within a bike lane, if provided). According to the CVC, bicycles may leave the right side of the road or a bike lane:*
    - *When overtaking and passing another bicycle or vehicle proceeding in the same direction.*
    - *When preparing for a left turn at an intersection or into a private road or driveway.*
    - *When reasonably necessary to avoid conditions (including, but not limited to, fixed or moving objects, vehicles, bicycles, pedestrians, animals, surface hazards, or substandard width lanes) that make it unsafe to continue along the right-hand curb or edge.*

- *When approaching a place where a right turn is authorized.*

  *If in any circumstance a bicyclist feels that it is unsafe to be passed in the curb lane, they are allowed to "take the lane"; common causes include debris near the curb, trash cans, parked cars, or narrow lane widths.*

- *Maintain intersection positioning – at intersections, bicyclists should travel in the right-most lane that leads to their destination. This means that if a bicycle is preparing to make a left turn, they may leave the right side of the road, even if a bike lane is provided, to enter the left turn pocket or the innermost through lane if the road has no left turn pocket.*

### FOR PEDESTRIANS

The *California Vehicle Code* Division 11 contains the rights and duties of pedestrians in Sections 21949 through 21971. The following is a summary of major laws for pedestrians; additional laws exist that are not included in this section:

- *The driver of a vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection*
- *Whenever any vehicle has stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway the driver of any other vehicle approaching from the rear shall not overtake and pass the stopped vehicle*
- *No pedestrian may walk upon any roadway outside of a business or residence district otherwise than close to his or her left-hand edge of the roadway*
- *A pedestrian may walk close to his or her right-hand edge of the roadway if a crosswalk or other means of safely crossing the roadway is not available or if existing traffic or other conditions would compromise the safety of a pedestrian attempting to cross the road*

## PUBLIC PARTICIPATION

Public participation played an essential role in the development of this plan. The City solicited public input regarding existing conditions for bicyclists and pedestrians, desired bicycling and walking infrastructure, and types of support facilities or programs needed to improve bicycling in West Sacramento. Public input was used to develop and prioritize the recommended network of bikeways, and to develop complementary educational, encouragement, and enforcement programs. The public participation included the following elements:

## PUBLIC WORKSHOPS

The City hosted three public workshops to solicit public feedback on existing issues regarding bicycling and walking in West Sacramento. Each workshop was the same, so residents and stakeholders had three opportunities to attend a workshop that fit best within their schedule. The workshops were held on:

- Tuesday, September 27, 2011 from 6:00 PM to 7:30 PM – at the West Sacramento Recreation Center
- Wednesday, October 5, 2011 from 12:00 PM to 1:00 PM – at the West Sacramento Community Center
- Thursday, October 13, 2011 from 5:30 PM to 7:30 PM – at the West Sacramento Community Center


2011 Public Workshop Notice

Voting boards were displayed at each workshop with the following questions:

- Which of the following elements have presented challenges for you while crossing roadways (as a pedestrian) in West Sacramento? Options included: crossing distance, crossing time, and driver awareness.
- Which of the following have you experienced while walking – or – knowledge of these issues have kept you from walking in West Sacramento? Options included: lack of continuous path, poor sidewalk/lack of needed curb ramp, and lack of adequate lighting.
- Which of the following setting issues have prevented you from walking or walking more often in West Sacramento? Options included: motor vehicle speed, water conditions, unattractive/uninviting scenery, and concerns about security/personal safety.
- Which of the following is the primary concern that prevents you from walking or walking more often in West Sacramento? Options included: roadway crossings, travel network/lack of connectivity issues, travel path conditions or setting, and other.
- What activities do you currently use or would like to use the pedestrian network for? Options included: walking alone or with a group, walking a dog, skating, skateboarding, accompanying a child on a bicycle, and other.
- Which of the following programs or groups would you be interested in attending or participating? Options included: cycling club, organized bicycle rides, walking group or club, pedestrian safety class, bicycle safety class, and bicycle maintenance class.
- Which type of bikeway do you prefer to use? Options included: bike path, bike lane, and bike route.
- Which of the following issues prevent you from riding a bicycle or riding more frequently in West Sacramento? Options included: motor vehicle speed or volume, parked car concerns, unattractive surroundings, concerns about personal safety, weather conditions, and other.

A resident at the October 5, 2011 public workshop

- Which type of bicycle signal detector do you prefer to use? Options included: loop detector, video detector, and push button detector.
- What other types of improvements would you like to see (more signs, pavement marking, etc) implemented to increase bicycle and pedestrian awareness and safety?

- Why do you ride? Options included: commuting to work, commuting to school, recreational/social, fitness, errands, and other.
- Why do you walk? Options included: commuting to work, commuting to school, recreational/social, fitness, errands, and other.
- What type of bike do you usually ride on the bikeway network? Options included: touring or commuting bike, racing bike, mountain bike, hybrid or comfort bike, cruiser, and other.

Participants at the October 5, 2011 provide comments on maps

- What type of bike rack element do you prefer for parking? Options included: inverted "U", "A", post and loop, wave, comb, and other.

Maps of the City were also displayed for workshop attendees to provide comments on the existing bicycle and pedestrian networks.

## ONLINE SURVEYS

An online survey was developed to receive additional public input on bicycling and walking conditions in West Sacramento. The survey included 22 questions about why people bicycle or walk, where they bike or walk, and what prevents them from biking or walking. The survey was completed by 252 people. Based on residential zip codes provided by survey respondents, approximately 63 percent of respondents were West Sacramento residents. Nine percent of respondents lived in Davis and the remaining respondents lived elsewhere in the Sacramento region.

## STAKEHOLDERS WORKSHOPS (TAC/CAC)

Two stakeholder workshops were held for the project Technical Advisory Committee (TAC) and Community Advisory Committee (CAC). The workshops were held on:

- December 18, 2012 from 4:00 PM to 7:00 PM – attendees reviewed draft deliverables describing existing conditions for bicyclists and pedestrians
- January 10, 2013 from 4:00 PM to 7:00 PM – attendees reviewed the draft proposed improvements for bicycling and walking

# CHAPTER 2. RELATIONSHIP TO OTHER PLANS

## CITYWIDE PLANS

### WEST SACRAMENTO GENERAL PLAN (1990)

The currently adopted *West Sacramento General Plan* (City of West Sacramento, 1990) was originally developed in 1990 and was most recently updated in 2004. The *General Plan* guides growth, development, and infrastructure in West Sacramento. It contains elements that address: land use, housing, transportation and circulation, public facilities and services, recreational and cultural resources, natural resources, health and safety, urban structure and design, and child care. The BPTMP is intended to serve as the bicycle, pedestrian, and trails component of the *General Plan*.

The City is currently completing an update to the *General Plan*; adoption is expected in 2013 or 2014.

### WEST SACRAMENTO BICYCLE AND PEDESTRIAN PATH MASTER PLAN (1995)

The *2013 West Sacramento Bicycle, Pedestrian, and Trails Master Plan* (City of West Sacramento, 2013) will supersede the *1995 Bicycle and Pedestrian Path Master Plan* (City of West Sacramento, 1995).

### WEST SACRAMENTO PARKS MASTER PLAN (2003)

The *West Sacramento Parks Master Plan* (City of West Sacramento, 2003) is a long-range plan that guides the development, operation, and maintenance of the City's park and open space system. The plan includes a description of recreation corridors with multi-purpose pathways that can be used for walking, running, biking, and equestrian use.

### WEST SACRAMENTO SAFE AND HEALTHY ROUTES TO SCHOOL PROJECT

WALKSacramento is currently partnered with the City of West Sacramento and the Washington Unified School District to complete the Safe and Healthy Routes to School Project. The project includes walk assessments at eight local schools and programs to improve the culture of walking and biking to school in West Sacramento.

### MAIN DRAIN PARKWAY

The Main Drain Parkway is the vision for a Class I bike path along the Main Drain Canal between Jefferson Boulevard and Marshall Road. Friends of the Main Drain Parkway is a non-profit activist organization dedicated constructing the Parkway by working with appropriate agencies, including the City of West Sacramento.

### WEST SACRAMENTO STANDARD SPECIFICATIONS AND DETAILS (2002)

West Sacramento's *Standards Specifications and Details* (City of West Sacramento, 2002) provide minimum standards for the design, construction, repair, and alternation of streets. Several design standards are relevant to bicycling and walking infrastructure.

### WEST SACRAMENTO MUNICIPAL CODE (2012)

*West Sacramento Municipal Code* (City of West Sacramento, 2012) includes several regulations that apply to bicyclists and pedestrians. It also includes building standards for new development.

### OTHER PLANS

Through the Planning Division, West Sacramento has completed several other plans or documents relevant to development and infrastructure:

- *Bridge District Specific Plan* (City of West Sacramento, 2009)
- *Southport Framework Plan* (City of West Sacramento, 1998)
- *Washington Specific Plan* (City of West Sacramento, 1996)

## REGIONAL PLANS

### SACOG METROPOLITAN TRANSPORTATION PLAN (MTP) 2035 (2012)

The BPTMP maintains consistency with regional programs that seek to reduce single-occupant motor vehicle travel. The *Metropolitan Transportation Plan* (MTP) (Sacramento Area Council of Governments [SACOG], 2035) recognizes the importance of bicycling and walking as a component "of an effective transportation system, particularly for short trips." The adopted MTP, as well as an update currently underway, envisions expanded facilities for bicyclists and pedestrians serving the entire Sacramento region, and a corresponding shift to a higher mode split for bicycling and walking.

## CALIFORNIA DELTA TRAIL

The California Delta Trail is the vision for a recreational trail along the Sacramento-San Joaquin Delta connecting Sacramento to the San Francisco Bay. The California Delta Trail concept originated through grass-roots support and was formalized by Senate Bill 1556 (Torlakson), which facilitates the planning and feasibility process for trail implementation. In 2010, the Delta Protection Commission issued The Great California Delta Trail Blueprint Report for Contra Costa and Solano Counties. Another similar report is anticipated for the counties of San Joaquin, Sacramento and Yolo.

## SACRAMENTO RIVER CROSSINGS ALTERNATIVES STUDY (2011)

The *Sacramento River Crossings Alternatives Study* (City of West Sacramento and City of West Sacramento, 2011) evaluates potential new crossings of the Sacramento River to provide connectivity to communities on both sides of the river. The study evaluates a variety of alternatives and considers land-use implications, transportation effects, environmental constraints, costs, and other related issues. As an outcome of the study, the cities of West Sacramento and Sacramento are pursuing three new Sacramento River crossings: a new all modes bridge between C Street in West Sacramento and the Railyards in Sacramento, a bicycle- and pedestrian- only bridge between the Bridge District in West Sacramento and R Street in Sacramento, and an all modes bridge between Pioneer Bluff in West Sacramento and Broadway in Sacramento.

## SACRAMENTO RIVERFRONT MASTER PLAN (2003)

The *Sacramento Riverfront Master Plan* (City of West Sacramento and City of West Sacramento, 2003) presents a vision for the future of the Sacramento Riverfront. It includes elements that address land use, transportation, open space, infrastructure, and other issues. Within West Sacramento, its study area extends from The Rivers to Pioneer Bluff.

## OTHER BICYCLE PLANS

The BPTMP is consistent with the following bicycle plans of neighboring jurisdictions:

- *City of Sacramento Bikeway Master Plan* (City of Sacramento, 2011)
- *County of Yolo Bicycle Transportation Plan – Bicycle Routes and Priorities* (County of Yolo, 2006)

# STATEWIDE INITIATIVES AND LEGISLATION

The BPTMP maintains consistency with statewide programs that will affect the implementation of future bicycle and pedestrian transportation facilities.

## ASSEMBLY BILL 32 (2006) AND SENATE BILL 375 (2008)

*Senate Bill 375* (SB 375) (Steinberg, 2008) is the implementation legislation for *Assembly Bill 32* (AB 32) (Nunez and Pavley, 2006). AB 32 requires the reduction of greenhouse gases (GHG) by 28 percent by the year 2020 and by 50 percent by the year 2050. Reducing automobile trips is one method of reducing GHG emissions. This may be achieved by promoting modes other than the automobile, such as walking, bicycling, or riding transit.

## ASSEMBLY BILL 1358 (2007)

*Assembly Bill 1358* (Leno and Levine, 2007) is the Complete Streets Act. It calls for the inclusion of all modes (pedestrian, bicycles, transit, and automobile) into the design of roadways.

## ASSEMBLY BILL 1581 (2012)

*Assembly Bill 1581* (Wieckowski and Wolk, 2012) provides direction that projects constructing new actuated traffic signals or modifying existing traffic signals include technology that has the ability to detect bicycles and motorcycles. It also calls for the timing of actuated traffic signals to account for bicycles.

## CALTRANS DEPUTY DIRECTIVE 64 (REVISION 1) DD-64-R1 (2008)

*Deputy Directive 64-R1* (DD-64-R1) (Caltrans, 2008) was issued to ensure that travelers of all ages and modes may move "safely and efficiently along and across a network of 'complete streets.'" The directive establishes responsibilities for Caltrans staff to safely accommodate bicyclists, pedestrians, and transit users.

# CHAPTER 3. GOALS AND POLICIES

## GENERAL PLAN GOALS AND POLICIES

The 1990 West Sacramento General Plan includes several policies relevant to bicycling, walking, and trail use:

**Goal G: To promote pedestrian and bicycle travel as alternatives to automobile use.**

**Policies:**

1. The City shall create and maintain a safe and convenient system of pedestrian and bicycle pathways which encourages walking or bicycling as an alternative to driving. New development shall be required to pay its fair share of the costs for development of this pathway system.
2. The City shall establish a safe and convenient network of identified bicycle routes connecting residential areas with recreation, shopping, and employment areas within the city. The City shall cooperate with surrounding jurisdictions in designing and implementing an area-wide bikeway system.
3. Bicycle routes shall emphasize paths separated from vehicle traffic to the maximum extent possible, but shall also include bicycle lanes within public streets; bikeways may, however, be combined with pedestrian and vehicle routes, where appropriate.
4. The City shall limit on-street bicycle routes to those streets where the available roadway width and traffic volumes permit safe coexistence of bicycle and motor vehicle traffic.
5. The City shall attempt to establish bicycle parking facilities at all new major public facilities, business and employment sites, and shopping centers.
6. Bicycle safety shall be considered when implementing improvements for automobile traffic operations.
7. To the extent practicable, bicycle and pedestrian pathways shall be included within open space areas and adjacent to waterways.
8. All new bridge crossings shall include bicycle and pedestrian pathways.

# BICYCLE, PEDESTRIAN, AND TRAILS MASTER PLAN GOALS AND POLICIES

In addition to the goals from the 1990 West Sacramento General Plan, this plan has the following goals:

1. A bicycle mode share of at least five percent and a walking mode share of at least ten percent by 2030.
2. A continuous network of low-stress bikeways between residential areas and key destinations.
3. A transportation system that is safe for bicycling and walking such that bicyclist- and pedestrian-vehicle collision rates decrease from 2013 levels.
4. Secure and convenient bike parking at all major bicycle trip generators and attractors.
5. A bicycle system that is well integrated with other forms of transportation, including public transit.
6. Educational opportunities aimed at all levels of bicyclists, pedestrians, motorists, and law enforcement personnel.

# CHAPTER 4. EXISTING BIKEWAYS AND TRAILS

## EXISTING BIKEWAYS AND TRAILS

Existing bikeways were inventoried in 2011 and 2012, primarily using aerial photography. Where necessary, field observations were completed to confirm bikeway features such as signage, striping, and stenciling. According to the inventory, West Sacramento has approximately 44.0 miles of existing bikeways and trails, as shown in Table 3.

**TABLE 3**
**LENGTH OF EXISTING BIKEWAYS AND TRAILS BY CLASSIFICATION**

| Classification | Mileage |
|---|---|
| Class I Bike Paths | 3.3 |
| Class II Bike Lanes | 30.0[1] |
| Class III Bike Routes | 3.2 |
| Unpaved Trail | 7.5 |
| **Total** | 44.0 |

Notes:

1. 28.8 miles of roadway have bike lanes on both sides of the roadway. 1.2 miles of roadway have bike lanes on one side of the roadway.

Source: Fehr & Peers, 2013

Figure 3 shows the existing bikeways within West Sacramento. Existing Class I bike paths include the River Walk Park trail along the Sacramento River near Tower Bridge, a connection to the bike path on the Yolo Causeway, a path along the levee north of Bryte Park, and small path segments connecting neighborhoods on Linden Road and Golden Gate Drive over the Main Drain Canal.

Class II bike lanes exist on many arterial and collector streets including segments of busy roadways such as Sacramento Avenue, Harbor Boulevard, West Capitol Avenue, and Jefferson Boulevard. However, there are major gaps in the network of bike lanes such as on Jefferson Boulevard at the Capital City Freeway interchange and on Harbor Boulevard at the Capital City Freeway interchange.

The City has very few Class III bike routes. Most bike routes connect continuous segments of bike lanes.

Unpaved trails with public access include the Clarksburg Branch Line Trail and trail segments along the Main Drain Canal.

# Figure 3 - Existing Bicycle Facilities

# Figure 4 - Existing Low Stress Bicycle Facilities

## EXISTING LOW-STRESS BIKEWAYS

Figure 4 shows the existing low-stress bikeways in West Sacramento. These are bikeways that have a Level of Traffic Stress of one or two (LTS 1 or LTS 2).

## REGIONAL CONNECTIONS

West Sacramento serves as a vital regional connection between Davis and Sacramento. Several bicyclists use the Yolo Causeway bike path and West Capitol Avenue to commute daily between the two cities. A segment of Class I bike path connects West Capitol Avenue to the Yolo Causeway on the west side of West Sacramento.

To connect to Sacramento, there are bike lanes on Tower Bridge. To reach Sacramento destinations other than downtown requires significant out-of-direction travel; there are no bicycle facilities on the I Street Bridge or the Pioneer Bridge.

## PAST EXPENDITURES ON BICYCLE FACILITIES

Based on the inventory of the existing bikeway network, an estimate of past expenditures is possible. Table 4 provides a summary of the past citywide expenditures on bicycle facilities, in 2013 dollars. Chapter 9 presents an explanation of 2013 per mile costs for the three bikeway classes.

**TABLE 4**
**PAST BICYCLE FACILITY EXPENDITURES**

| Classification | Mileage | 2013 Per Mile Cost | Expenditure |
|---|---|---|---|
| Class I Bike Paths | 3.3 | $530,000 | $1,749,000 |
| Class II Bike Lanes | 30.0[1] | $740,000 | $22,200,000 |
| Class III Bike Routes | 3.2 | $10,000 | $32,000 |
| Unpaved Trail | 7.5 | $120,000 | $900,000 |
| **Total** | 44.0 | N/A | $24,881,000 |

Notes:
1. 28.8 miles of roadway have bike lanes on both sides of the roadway. 1.2 miles of roadway have bike lanes on one side of the roadway.

Source: Fehr & Peers, 2013

As shown in Table 4, past expenditures on citywide bicycle facilities total approximately $24.8 million. Since a substantial portion of City's bike lanes were constructed as part of new development or other roadway construction, the City's actual share of the total expenditure on bicycle facilities is less than $24.8 million.

## SUPPORT FACILITIES

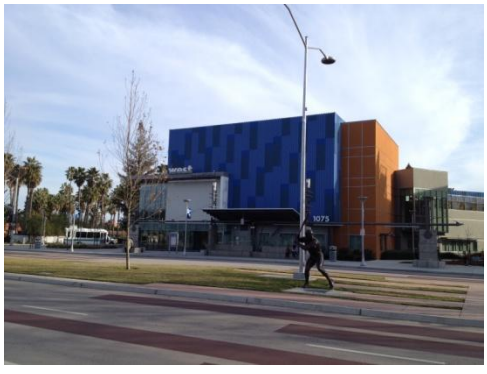
Support facilities include bicycle parking, shower and changing space, and secure storage for bicycle gear. Short-term bicycle parking is provided at several locations in West Sacramento including schools, commercial centers, parks, and municipal buildings. However, short-term bicycle parking is missing at several older commercial centers and some major trip attractors, such as Raley Field. Few long-term bicycle parking and shower/locker facilities currently exist. Exceptions include a limited number of bike lockers available at City Hall.

Currently, the City has adopted the *2010 California Green Building Standards Code* (California Building Standards Commission, 2010) as mandatory provisions in *West Sacramento Municipal Code* Section 15.12.040. The mandatory provisions include the following language regarding bicycle parking requirements at non-residential buildings:

- ***Short-Term bicycle parking.*** *If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 100 feet of the visitors' entrance, readily visible to passers-by, for five percent of the visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.*
- ***Long-Term bicycle parking.*** *For buildings with over ten tenant-occupants, provide secure bicycle parking for five percent of motorized vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:*
  1. *Covered, lockable enclosures with permanently anchored racks for bicycles;*
  2. *Lockable bicycle rooms with permanently anchored racks; and*
  3. *Lockable, permanently anchored bicycle lockers.*

## MULTIMODAL CONNECTIONS

Yolobus is the primary transit provider in West Sacramento and offers both fixed-route and demand-responsive bus service. Eight fixed local routes provide hourly or peak-only service



The West Sacramento Transit Center

within West Sacramento; service hours vary by route and day of the week.

- Route 35 – Southport Local – hourly service between Southport and West Sacramento
- Route 39 – Southport/Sacramento Commute – peak-only service between Southport and Downtown Sacramento
- Routes 40 and 41 – West Sacramento Local – hourly service between West Sacramento and Downtown Sacramento
- Routes 42A and 42B – Intercity Loop Clockwise and Counter-Clockwise – hourly service between West Sacramento, Davis, Woodland, Sacramento International Airport, and Downtown Sacramento
- Route 240 – West Sacramento/Sacramento Shuttle – hourly service between West Sacramento and Downtown Sacramento
- Route 241 – West Sacramento/Sacramento Commute – peak-only service between West Sacramento and Downtown Sacramento

All Yolobus buses are equipped with bike racks. Regular service buses feature front-mounted bike racks that accommodate three bicycles. Touring coaches feature luggage-bay racks that accommodate three bicycles. All bus bike racks are available on a first-come, first-served basis. Bikes are not allowed inside the buses at any time. Bus stops do not typically feature bike racks.

Figure 5 shows existing multimodal connections in West Sacramento, including existing Yolobus routes, park-and-rides, and the West Sacramento Transit Center.

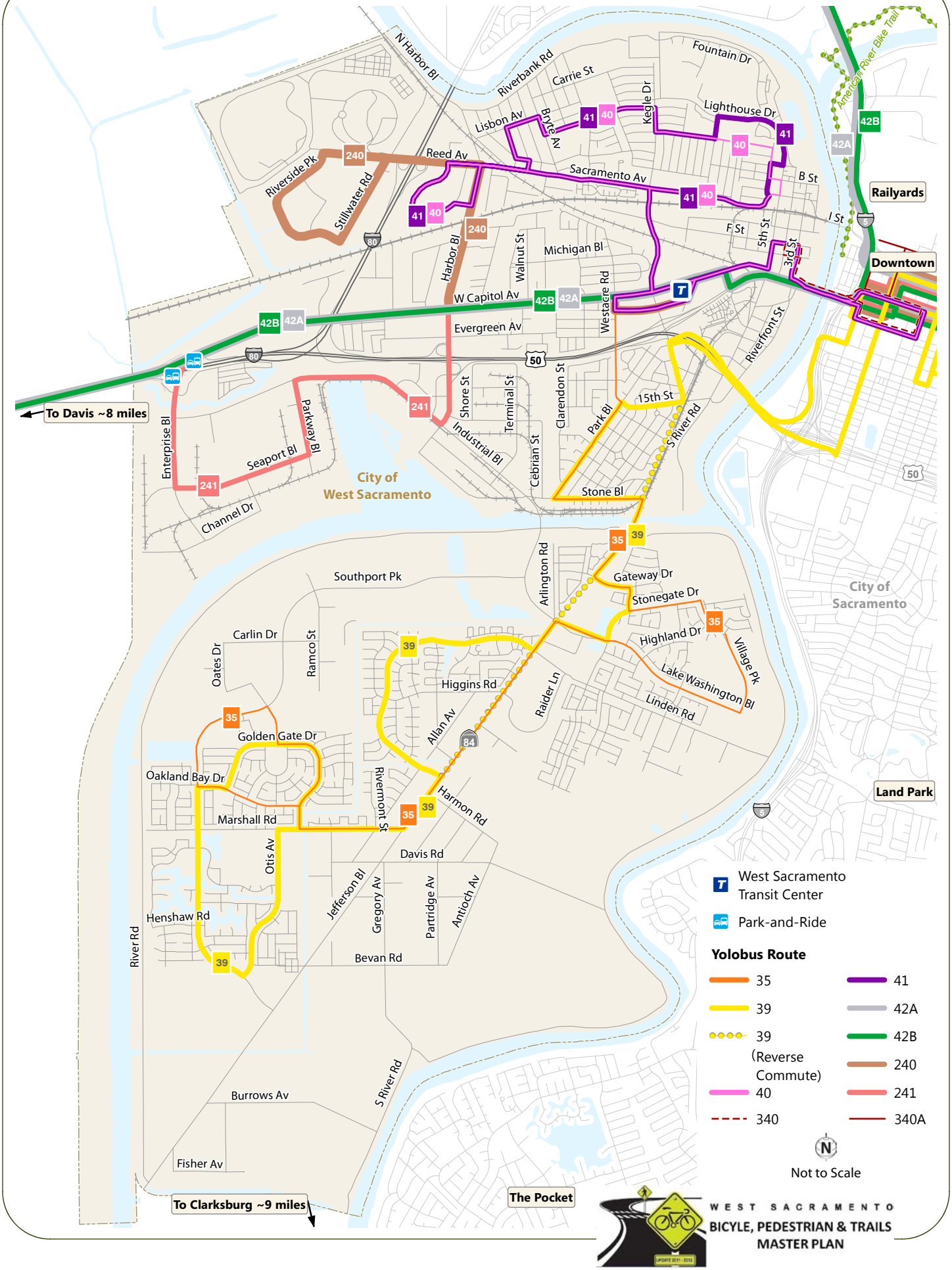
## EXISTING AND FUTURE LAND USE PATTERNS

West Sacramento includes a diversity of land uses. Residential uses range from high density in the Bridge District and the Washington Specific Plan area, to medium density in the north part of Southport, to rural low density in Southport south of Davis Road. Commercial land uses range from neighborhood commercial uses such as those on West Capitol Avenue at Jefferson Boulevard to regional commercial centers such as Riverpoint, which includes Ikea, Wal-Mart, and The Home Depot. The City has a significant industrial area that largely serves the Port of West Sacramento. Figure 6 shows these existing land use patterns.

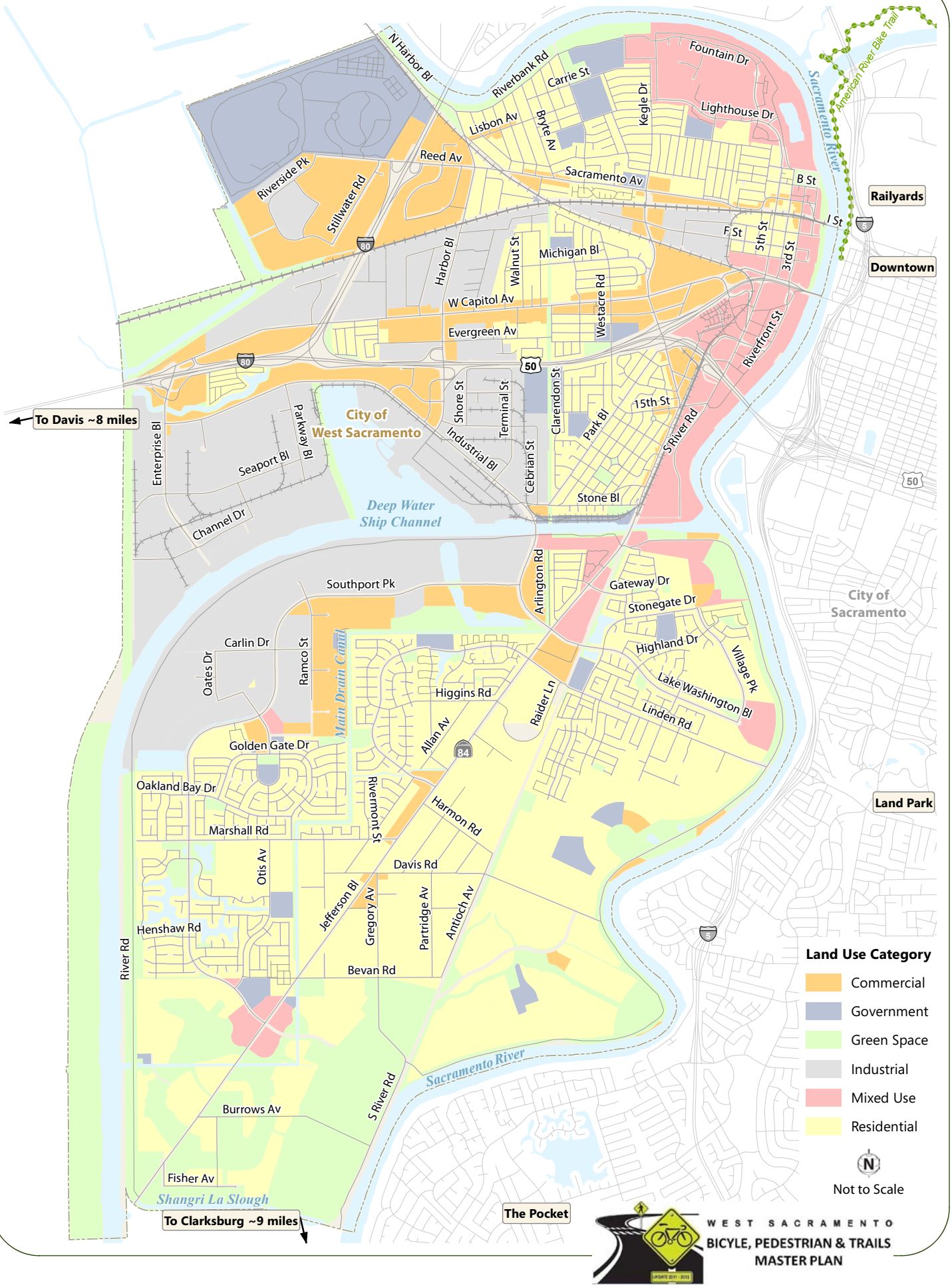
Figure 7 shows several planned land use and transportation projects that will influence West Sacramento's urban landscape. Major planned land use projects include redevelopment of the City's waterfront near Downtown Sacramento in the Bridge District and Washington Specific Plan area, continued medium

density residential development in Southport, and commercial/industrial development near the Port of West Sacramento. Major planned transportation projects include the South River Road Bridge over the Deep Water Ship Channel, a new bridge over the Sacramento River at C Street, and an extension of Village Parkway in Southport. The City is currently participating in a multijurisdictional effort to connect West Sacramento to Downtown Sacramento via streetcar. Within West Sacramento, the proposed streetcar would run on Tower Bridge Gateway and West Capitol Avenue.

# Figure 5 - Existing Multimodal Connections

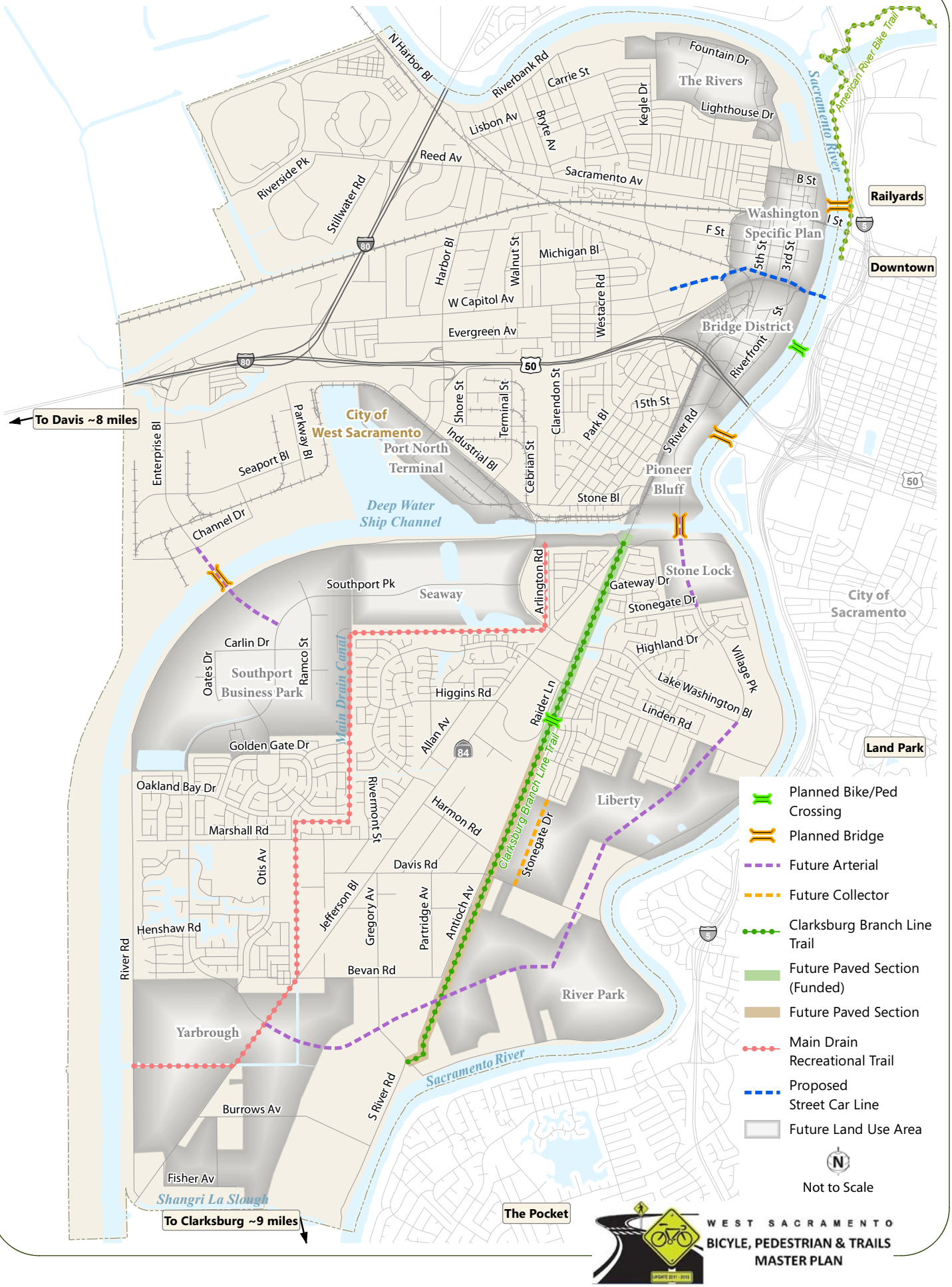


# Figure 6 - Existing Land Use Patterns




WEST SACRAMENTO
BICYCLE, PEDESTRIAN & TRAILS MASTER PLAN

# Figure 7 - Planned Land Use and Transportation Projects



## TRIP GENERATORS AND ATTRACTORS

Certain activity centers such as schools, commercial centers, municipal buildings, parks, and regional destinations require special emphasis because of their potential to attract bicycle travel. The West Sacramento BPTMP attempts to provide connections to as many of these major activity centers as possible. Figure 8 shows the locations of major bicycle and pedestrian trip generators and attractors.

Currently, West Sacramento has seven elementary schools, one high school (River City High School), and a few alternative schools. Additionally, Sacramento City College, part of the Los Rios Community College District, operates the West Sacramento Center on West Capitol Avenue. West Sacramento recognizes the importance of safe pedestrian and bicycle routes to school sites. The City will continue to work cooperatively with local school districts in developing and improving safe pedestrian and bicycle travel routes to schools.

Major commercial centers include Riverpoint (which includes Ikea, Wal-Mart, and The Home Depot), the Safeway and Raley's on West Capitol Avenue, and the Target, Nugget Market, and Lowe's Home Improvement in Southport. There are several large and small parks throughout the City; major parks include Bryte Park, Bridgeway Lakes Community Park, and River Walk Park. Municipal buildings primarily include the recently constructed City Hall and the West Sacramento Community Center. One of the most significant regional destinations in West Sacramento is Raley Field, home of the Sacramento River Cats minor league baseball team. Raley Field's seating capacity is approximately 14,680.


Raley Field

West Sacramento City Hall

# Figure 8 - Bicycle and Pedestrian Trip Generators and Attractors (and Bicyle Parking Facilities)

# EXISTING AND FORECAST BICYCLE USE

Data regarding existing bicycle use in West Sacramento is limited. The *2007-2009 American Community Survey* (US Census Bureau, 2010) includes information regarding means of transportation to work. According to the *2007-2009 American Community Survey* (ACS), 1.1 percent of West Sacramento residents bicycle and 1.9 percent walk as their primary means of transportation to work. In total, three percent of City residents either bike or walk to work. . These figures do not account for occasional bicycle or walking commuters, or include non-commute bicycle or walk trips to locations such as schools or shopping centers. In most areas, the percentage of non-commute bicycle and walk trips is greater than the percentage of bicycle and walk commute trips, as commute trips tend to be longer and less bikeable or walkable than shopping or school-related trips. Therefore, West Sacramento's overall bicycle and walk mode split is likely higher than the ACS estimates.

The *2000 Census* (US Census Bureau, 2001) included detailed transportation planning information that was not repeated for the *2010 Census* (US Census Bureau, 2011), including information about means of transportation to work depending on home and work location. Table 5 displays the bicycle and walking mode split for West Sacramento derived from journey-to-work data collected as part of the *2000 Census*. As shown in Table 5, the bicycle and walking mode split depends on work location. For West Sacramento residents who also work in West Sacramento, the bicycle and walking mode split is 2.5 percent and 5.4 percent, respectively

**TABLE 5**
**EXISTING HOME-WORK MODE SPLIT**

| From/To | Percent Bicycle | Percent Walk |
|---|---|---|
| From/To West Sacramento | 2.5% | 5.4% |
| West Sacramento to Sacramento | 0.8% | 0.5% |
| West Sacramento to Other Regional Destinations | 1.2% | 0% |

Source: Fehr & Peers, 2013

According to the California Department of Finance, West Sacramento's population as of 2012 was approximately 49,300. Data obtained from the California Employment Development Department indicates that approximately 13,700 West Sacramento residents are currently employed. Therefore, approximately 150 West Sacramento residents currently bike and 260 walk as their primary means of transportation to work. West Sacramento's bicycle mode split is greater than the California statewide average bicycle mode split (0.8 percent).

May is Bike Month, the local competition that challenges residents of the Sacramento region to set and achieve a mileage goal, is another data source of information regarding existing levels of bicycling. The registered number of West Sacramento residents participating in May is Bike Month varies each year; however, in 2012, the 241 registered West Sacramento residents rode a total of 45,726 miles. 26,067 (57 percent) of those miles were for recreational purposes. The remaining 19,659 (43 percent) of miles were for commuting, errands, or work trips. The number of registered participants in the region, and the total number of miles ridden, has increased each year since the first May is Bike Month is 2007. This trend is expected to continue in West Sacramento and the Sacramento region.

West Sacramento's goal is to achieve a bicycle mode share of five percent and a walk mode share of ten percent by the year 2030. This combined bicycle and walk mode share of 15 percent would nearly match the Federal Highway Administration (FHWA) goal of 15.8 percent. According to SACOG, West Sacramento's population is expected to grow to 73,500 residents by 2030. Assuming the City achieves a five percent bicycle mode share and a ten percent walk mode share, there would be over 1,000 bicycle commuters and over 2,000 walk commuters in 2030, based on the 2012 rate of employed residents.

## SHIFTING DEMOGRAPHICS

Walking is especially important to West Sacramento's senior citizens, who walk for a variety of purposes including for errands, to visit friends or family, and to transit. Additionally, walking has a positive effect on senior citizen health. According to the *2010 Census* (US Census Bureau, 2011), 9.8 percent of West Sacramento's residents are over 65. According to *Graying in the Golden State* (Tafoya and Johnson, 2000), in California, the population over 65 years old is expected to increase from 11 percent in 1998 to 17 percent in 2030; West Sacramento's proportion of residents over 65 will likely increase similarly. Improving the availability and quality of walking infrastructure in West Sacramento will better serve the growing proportion of the population over 65.

## BICYCLE SAFETY

Five years of California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) data for bicyclist-vehicle collisions was reviewed to identify collision locations and trends in West Sacramento. Figure 9 shows the locations of bicyclist-vehicle collisions. Table 6 summarizes the collision data by year and collision severity.

**TABLE 6**
**WEST SACRAMENTO BICYCLIST-VEHICLE COLLISION SUMMARY**
**(JANUARY 2006 – DECEMBER 2010)**

| Year | Number of Bicyclist-Vehicle Collisions | | |
|---|---|---|---|
| | Total[1] | Injury | Fatality |
| 2006 | 13 | 5 | 0 |
| 2007 | 24 | 18 | 0 |
| 2008 | 26 | 18 | 0 |
| 2009 | 20 | 13 | 0 |
| 2010 | 25 | 10 | 0 |
| **Total** | **108** | **64** | **0** |

Notes:

1. Collisions that did not result in an injury or fatality were classified as "property damage only" collisions.

Source: California Highway Patrol

The SWITRS data was also analyzed for the Primary Collision Factors (PCFs). Table 7 shows the most common PCFs for bicyclist-vehicle collisions in West Sacramento.

**TABLE 7**
**WEST SACRAMENTO BICYCLIST-VEHICLE COLLISION SUMMARY PRIMARY COLLISION FACTORS**
**(JANUARY 2006 – DECEMBER 2010)**

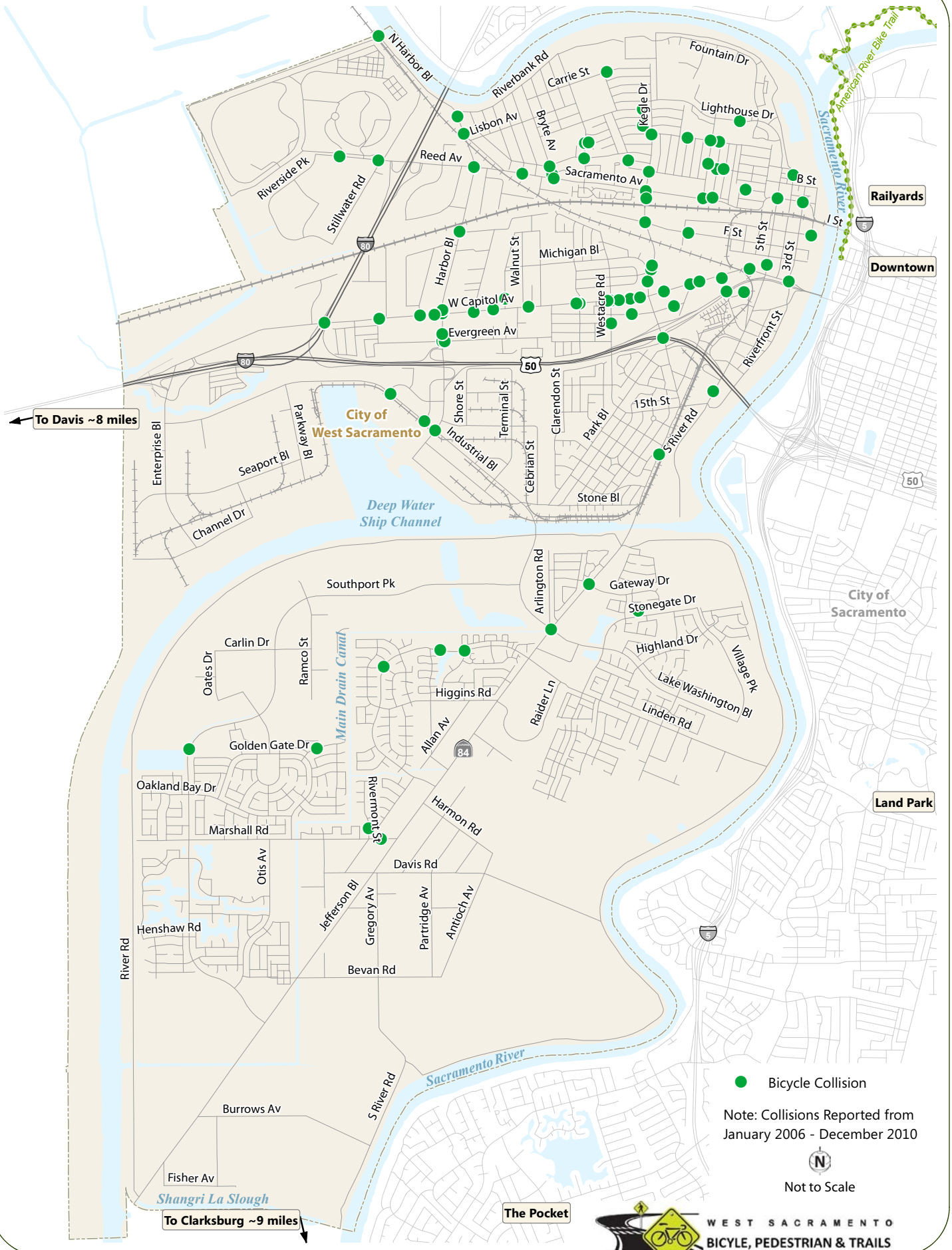
| Primary Collision Factor | Number of Bicyclist-Vehicle Collisions | | | |
|---|---|---|---|---|
| | Non-Injury | Injury | Fatality | Total |
| Wrong Side of Road | 10 | 27 | 0 | 37 |
| Automobile Right of Way (Bicyclist not yielding) | 7 | 11 | 0 | 18 |
| Improper Turning | 5 | 6 | 0 | 11 |
| Traffic Signals and Signs | 6 | 4 | 0 | 10 |
| Unsafe Speed | 4 | 0 | 0 | 4 |
| Other | 9 | 16 | 0 | 25 |

Source: California Highway Patrol

As shown in Table 7, the most common PCFs were bicyclists riding on the wrong side of the road and bicyclists not yielding right-of-way to drivers. Collisions due to these factors can be particularly affected through targeted bicyclist education.

SWITRS data also provides information on the lighting condition when the collision occurred. Of the 108 bicyclist-vehicle collisions studied, 82 percent occurred during daylight. Fourteen percent of bicyclist-vehicle collisions occurred in the dark and the remaining collisions occurred during dusk or dawn.

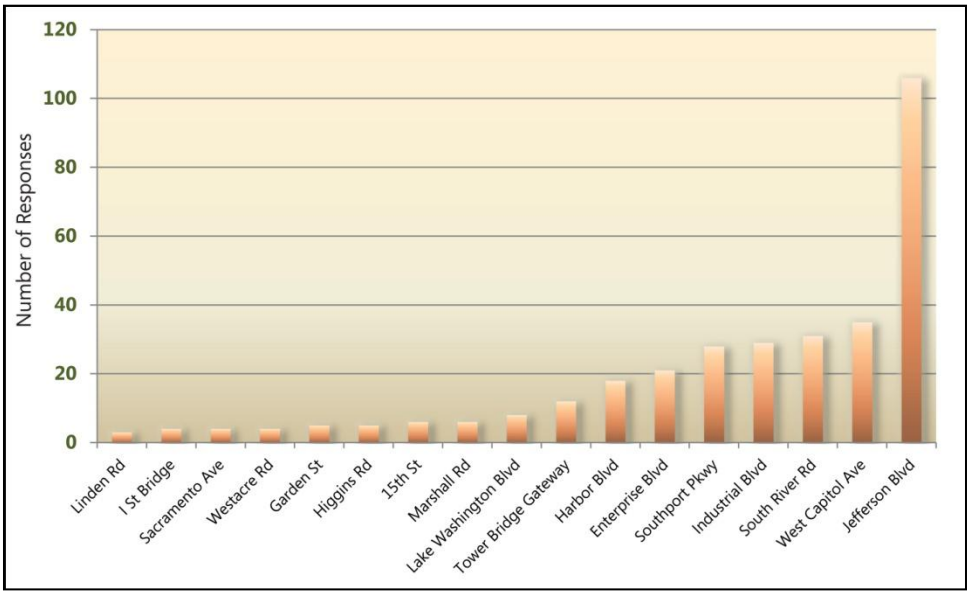
# Figure 9 - 5-Year Bicycle Collisions (with Autos)



# PUBLIC INPUT

Feedback from the public is valuable for further understanding the issues that affect bicycling in West Sacramento.

Online survey participants responded to the prompt "Identify the top three locations in West Sacramento where it is difficult to bike". The following chart shows the number of responses registered for various roadways in West Sacramento.




As shown in the above chart, Jefferson Boulevard and West Capitol Avenue were considered the most difficult roadways to bike along or across in West Sacramento.

Online survey participants also answered the question "What keeps you from bicycling more often (choose all that apply)?" Table 8 shows the number and percentage of respondents for various issues that prevent bicycling.

**TABLE 8**
**SURVEY RESPONSE RESULTS**
**"WHAT KEEPS YOU FROM BICYCLING MORE OFTEN (CHOOSE ALL THAT APPLY)?"**

| Issue | Respondent Count | Respondent Percentage |
|---|---|---|
| Lack of bike lanes, routes, or paths | 179 | 76% |
| Motor vehicle traffic volume and/or speed | 138 | 59% |
| Pavement or surface conditions | 115 | 49% |
| Motor vehicle driver behavior | 104 | 44% |
| Debris obstacles in path, lane, or shoulder | 65 | 28% |
| Intersection conditions | 59 | 25% |
| Travel distance | 52 | 22% |
| Travel time | 49 | 21% |
| Exposure to varying weather conditions | 49 | 21% |
| Lack of bicycle parking at destinations | 48 | 20% |
| Darkness | 46 | 20% |
| Other (please specify) | 39 | 17% |
| Lack of signs and markings along routes | 37 | 16% |
| Don't want to get sweaty or have to change clothes | 36 | 15% |

Source: Fehr & Peers, 2013

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# CHAPTER 5. PROPOSED BIKEWAYS AND TRAILS

This chapter describes the proposed West Sacramento bikeway and trails network, and the criteria used to develop and prioritize proposed facilities. Public input received during three workshops, the online survey, and the stakeholder workshops greatly assisted with the development of the proposed network. This chapter highlights several of the proposed bikeway and trail facilities, and discusses proposed bikeway support facilities intended to enhance utilization and enjoyment of existing and proposed bikeways in the City.

## PROPOSED BIKEWAYS

The proposed bikeway network presented in Figure 10 is a continuous system of bikeways and trails connecting to numerous local destinations within the City, as well as regional destinations. The design of the network aims to accommodate all levels of bicyclists, and increase the amount of both utilitarian and recreational bicycling in West Sacramento. Table 9 summarizes the mileage of existing and proposed bicycle facilities by facility type. As shown, the proposed bicycle network expands upon existing Class I bike paths and Class II bike lanes in the City, and also envisions two major Class III bike routes.

**TABLE 9**
**LENGTH OF EXISTING AND PROPOSED BIKEWAYS AND TRAILS BY CLASSIFICATION**

| Classification | Existing Mileage | Proposed Mileage | Total |
|---|---|---|---|
| Class I Bike Paths | 3.3 | 30.9 | 34.2 |
| Class II Bike Lanes | 30.0[1] | 19.3[2] | 49.3 |
| Class III Bike Routes | 3.2 | 7.4 | 10.6 |
| Unpaved Trail | 7.5 | 2.2 | 9.7 |
| **Total** | 44.0 | 59.8 | 103.8 |

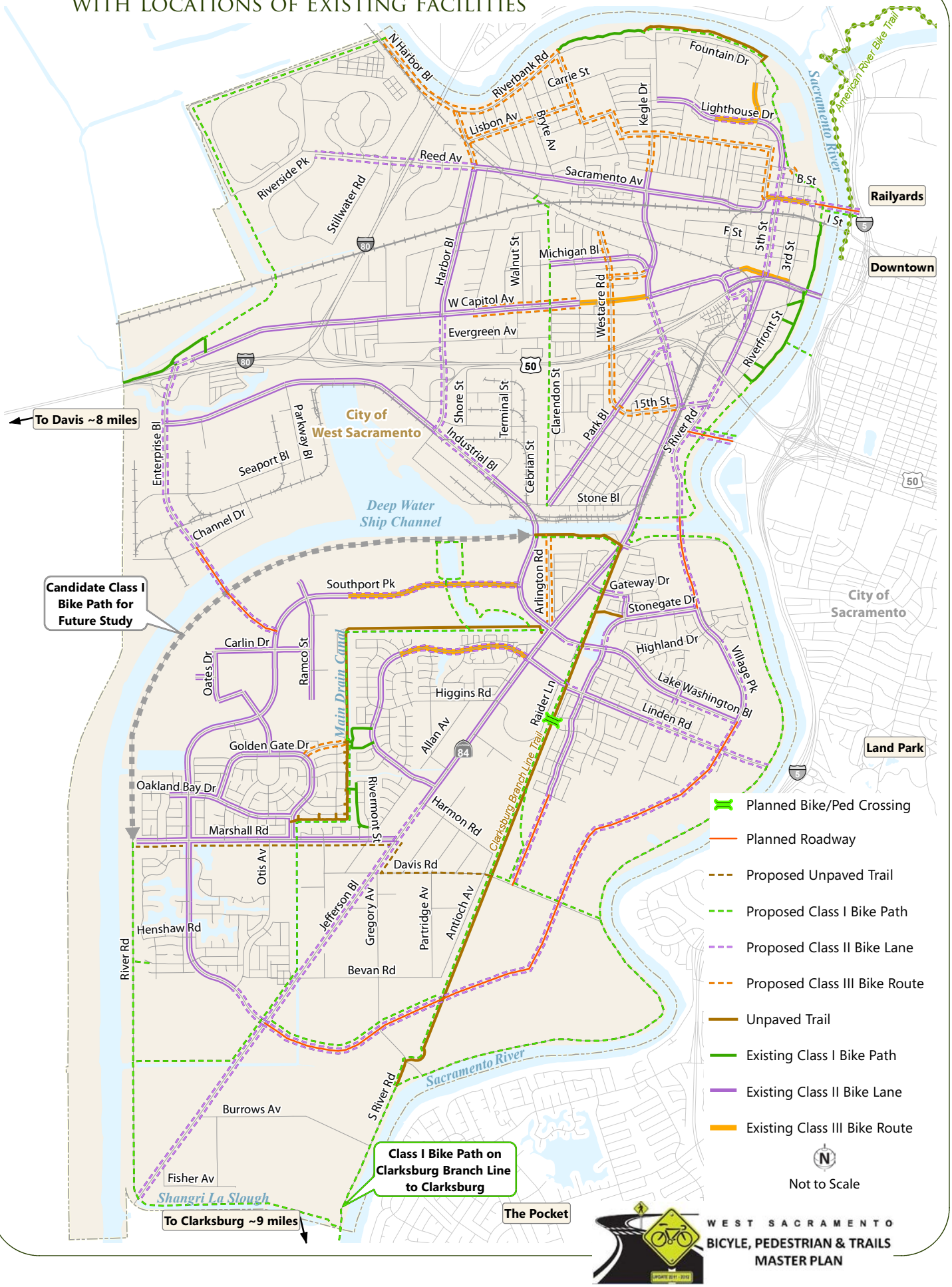
Notes:

1. 28.8 miles of roadway have bike lanes on both sides of the roadway. 1.2 miles of roadway have bike lanes on one side of the roadway.
2. 18.1 miles of roadway have proposed bike lanes on both sides of the roadway. 1.2 miles of roadway have proposed bike lanes on one side of the roadway.

Source: Fehr & Peers, 2013

As shown in Figure 10, Class I bike paths are primarily located along opportunity right-of-ways such as rivers, canals, and abandoned railroads. Class II bike lanes are proposed for several arterial and collector streets. Class III bike routes, proposed by this plan as high-quality bike boulevards, are proposed near Bryte Park and on Westacre Road.

# Figure 10 - Proposed Bicycle Network with Locations of Existing Facilities



## CLASS I BIKE PATHS

The proposed network of bicycle facilities shown in Figure 10 includes several miles of additional Class I bike paths that would form a connected system of high-quality bicycle facilities. These facilities would provide significant utilitarian and recreational function, linking several local and regional destinations. Highlights of this proposed system of Class I bike paths are discussed below:

- **Clarksburg Branch Line Trail** – This proposed bike path is currently an unpaved trail along an abandoned railroad right-of-way. The City owns the entire ten mile length between the Deep Water Ship Channel and Clarksburg in unincorporated Yolo County. As proposed, the entire length would become paved, including the section in unincorporated Yolo County. The City has already acquired funding to pave the trail between South River Road and River City High School. The trail will cross the Deep Water Ship Channel using the unused rail right-of-way on the Jefferson Boulevard Bridge. This proposed path will connect east Southport to destinations north of the Deep Water Ship Channel. The City will coordinate with Yolo County regarding implementation beyond their City limits.

The Clarksburg Branch Line Trail

- **Main Drain Parkway** – Segments of this proposed bike path are already open for public access; however, they are unpaved. This proposed bike path will run parallel to the Main Drain Canal, and will connect west Southport to destinations north of the Deep Water Ship Channel.
- **Sacramento River Trail** – As a part of West Sacramento levee upgrades, the existing levee along the Sacramento River will be replaced with a new, land-side levee. As a part of the levee upgrades, the existing levee and South River Road will be demolished. This proposed bike path will run along the new levee; however, the exact alignment is to be determined.

Existing unpaved trail along the Main Drain Canal

- **Deep Water Ship Channel Trail** – This proposed bike path will run along the existing levees on the south side of the Deep Water Ship Channel between Marshall Road and the Main Drain Parkway to the south. The segment between Arlington Road and Marshall Road requires further study before it can be included as a proposed Class I bike path.

- **River Walk Park Trail** – Segments of this proposed bike path are already constructed along the Sacramento River between Capital City Freeway and I Street. As proposed, this bike path will be continuous between the Deep Water Ship Channel and Riverbank Road. Major projects include undercrossings at the existing Tower Bridge and I Street Bridge.

The River Walk Park trail currently terminates at the I Street Bridge

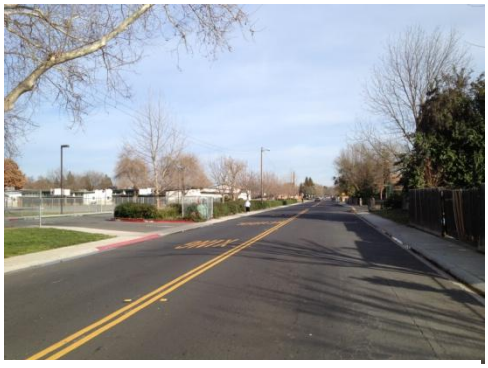
## CLASS II BIKE LANES

The proposed West Sacramento bikeway network includes several new, extended, or improved Class II bike lanes, designed to capitalize upon previous investments in on-street lanes and increase the viability of commuter bicycling. Many of these bike lanes interface with one or more of the previously discussed Class I bike paths. The plan includes new and/or improved bicycle lanes within existing commercial areas, and connecting to several of the City's schools and parks. In total, over 49 miles of Class II bike lanes are included in the proposed bicycle network.

## CLASS III BIKE ROUTES

The proposed bikeway network includes key Class III bike route projects classified as "bicycle boulevards", a local street or series of contiguous street segments that have been modified to function as a through street for bicyclists. Bicycle boulevards typically discourage major through automobile travel while maintaining local access. These key bicycle boulevards include:

- **Bryte Park Bicycle Boulevard** – This proposed bicycle boulevard will connect Bryte Park, Riverbank Elementary School, Elkhorn Village Elementary School, and the residential neighborhoods north of Sacramento Avenue to the new bridge over the Sacramento River at C Street. According to traffic counts from 2007, the traffic volume on Cummins Way is approximately 2,500 vehicles per day. Traffic volumes of up to 3,000 vehicles per day are generally appropriate for a bicycle boulevard. Several improvements may be necessary to make this a high-quality bicycle boulevard, including: traffic calming to ensure vehicle speeds remain below 25 miles per hour, the reorientation of traffic control devices, wayfinding signs and markings, and crossing treatments at C Street.



Cummins Way near Elkhorn Village Elementary School

- **Westacre Road Bicycle Boulevard** – Westacre Road provides the primary bicyclist and pedestrian crossing of Capital City Freeway west of Jefferson Boulevard. This proposed bicycle boulevard would offer a low-stress connection between destinations on either side of Capital City Freeway. According to traffic counts from 2007, the traffic volume on Westacre Road is approximately 6,500 vehicles per day. Traffic volumes of up to 3,000 vehicles per day are generally appropriate for a bicycle boulevard. Several improvements may be necessary to make this a high-quality bicycle boulevard, including: bicycle crossing treatments at West Capitol Avenue and Merkley Avenue, traffic calming to ensure vehicle speeds remain below 25 miles per hour, adequate lighting underneath US 50, and wayfinding signs and markings.

US 50 bridge over Westacre Road

## PROPOSED LOW-STRESS BIKEWAYS

Figure 11 shows the proposed low-stress bikeways in West Sacramento. These are bikeways that have a Level of Traffic Stress of one or two (LTS 1 or LTS 2). The proposed low-stress bikeway network provides extensive continuity to many local and regional destinations in West Sacramento. Completion of the proposed low-stress bikeway network will offer the greatest opportunity to significantly increase West Sacramento's bicycle mode share; it will allow residents and visitors of all ages and abilities to complete many types of trips by bicycling and walking, including trips to school, to work, for errands or for recreation. Additionally, by contributing to a high quality of life in West Sacramento, completion of the proposed low-stress bikeways will attract high quality economic development.

On some existing and proposed bikeways that do not qualify as low-stress, the Level of Traffic Stress could be decreased by implementing one of several innovative design treatments. In general, most stress decreasing designs use vertical or horizontal treatments to further separate bicyclists from vehicle traffic. Candidate innovative design treatments that decrease stress on on-street bikeways primarily include buffered bike lanes and protected or raised cycle tracks. The City should evaluate innovative designs to reduce the Level of Traffic Stress as it moves forward with the implementation of the proposed bicycle network.

# Figure 11 - Proposed Low Stress Bicycle Network with Locations of Existing Facilities

# SUPPORT FACILITIES

## BICYCLE PARKING

### Current Requirements

Currently, the City has adopted the *2010 California Green Building Standards Code* as mandatory provisions in *West Sacramento Municipal Code* Section 15.12.040. The mandatory provisions include the following language regarding bicycle parking requirements at non-residential buildings:

- ***Short-Term bicycle parking.*** *If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 100 feet of the visitors' entrance, readily visible to passers-by, for five percent of the visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.*
- ***Long-Term bicycle parking.*** *For buildings with over ten tenant-occupants, provide secure bicycle parking for five percent of motorized vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:*
  1. *Covered, lockable enclosures with permanently anchored racks for bicycles;*
  2. *Lockable bicycle rooms with permanently anchored racks; and*
  3. *Lockable, permanently anchored bicycle lockers.*

### Recommendations

At minimum, the City should modify the Municipal Code to reflect the *2010 California Green Building Standards Code* mandatory provisions regarding bicycle parking in *West Sacramento Municipal Code* Chapter 17.34 Off-Street Parking and Loading.

The *2010 California Green Building Standards Code* mandatory provisions regarding bicycle parking represent basic accommodations for bicyclists. The City should consider adopting revised bicycle parking requirements that reflect national best practices, such as the *Bicycle Parking Guidelines (*Association of Pedestrian and Bicycle Professionals [APBP], 2010) or the City of Portland minimum required bicycle parking spaces describe in *Portland Zoning Code* Chapter 33.266 (City of Portland, 2013).

## SHOWER/CHANGING FACILITIES

### Current Requirements

The City does not currently require that shower/changing facilities at non-residential buildings be provided.

### Recommendations

The City should consider adopting the *2010 California Green Building Standards Code* voluntary measures for shower/changing facilities. The voluntary measures include the following language regarding shower/changing facilities:

> ***Changing rooms.*** *For buildings with over ten tenant-occupants, provide changing/shower facilities for tenant-occupants only in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.*
>
> *For public schools and community colleges, provide changing/shower facilities for the "number of administrative/teaching staff" equal to the "number of tenant-occupants" shown in Table A5.106.4.3.* (Table 10)

**TABLE 10**
***2010 CALIFORNIA GREEN BUILDING STANDARDS CODE***
**TABLE A5.106.4.3**

| Number of Tenant-Occupants | Shower/Changing Facilities Required[2] | 2-Tier (12"x15"x72") Personal Effects Lockers[1,2] Required |
|---|---|---|
| 0-10 | 0 | 0 |
| 11-50 | 1 unisex shower | 2 |
| 51-100 | 1 unisex shower | 3 |
| 101-200 | 1 shower stall per gender | 4 |
| Over 200 | 1 shower stall per gender for each 200 additional tenant-occupants | One 2-tier locker for each 50 additional tenant-occupants |

Notes:
1. One 2-tier locker serves two people. Lockers shall be lockable with either padlock or combination lock.
2. Tenant spaces housing more than ten tenant-occupants within buildings sharing common toilet facilities need not comply; however, such common shower facilities shall accommodate the total number of tenant-occupants served by the toilets and include a minimum of one unisex shower and two 2-tier lockers.

Source: *2010 California Green Building Standards Code*

## BIKE SHARING

Bike sharing station in Denver, Colorado

Bike sharing is a transportation service that provides users the ability to pick up a bicycle at any self-serve bike sharing station in the network and return it to any other bike sharing station (including the origin). It typically provides point-to-point transportation for short distance trips (0.5 to three miles). Most public bike sharing systems require users to purchase an inexpensive membership; usage fees are typically applied based on how long a bike is used. Several American cities have already implemented successful bike sharing systems, including Denver, Colorado, Washington, D.C., and Minneapolis, Minnesota.

Bike sharing systems and stations experience highest ridership in urbanized areas with high levels of population and employment density. A regional bike sharing system can benefit West Sacramento by improving connections between destinations in West Sacramento and other destinations in Sacramento and Davis. Bike sharing could serve West Sacramento destinations such as Raley Field, City Hall and the West Sacramento Community Center, employment centers near River Walk Park, and other areas with high population and employment density.

The Sacramento Metropolitan Air Quality Management District is leading the development of a business plan for a bike sharing system in the Sacramento region. The business plan will be complete by mid-2013. The plan will identify the proposed service area, station locations, and a timeline for implementation. The City of West Sacramento is a stakeholder in the plan development process and will participate in subsequent efforts to implement a bike sharing system.

## MULTIMODAL CONNECTIONS

Currently, all Yolobus buses are equipped with bike racks that accommodate three bicycles. Bikes are not allowed inside the buses at any time under any circumstance. Yolobus should consider modifying their policy regarding bikes inside buses to allow them if there are no open positions on the bike rack and it is the last bus of the day on a local fixed route.

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# CHAPTER 6. EXISTING CONDITIONS FOR PEDESTRIANS

## EXISTING PEDESTRIAN FACILITIES

Continuous sidewalks are provided on many roadways in West Sacramento, particularly on arterial and collector streets north of the Deep Water Ship Channel and in Southport's new development areas. However, there are numerous gaps in the sidewalk network within these urbanized areas, including several on busy streets such as West Capitol Avenue and Jefferson Boulevard. Consistent with their rural designation, many rural residential roadways in Southport do not feature sidewalks.

Marked crosswalks are provided at approaches to most signalized intersections and at approaches to some stop-controlled intersections. Uncontrolled marked crosswalks exist at several locations that experience high pedestrian volumes. Many of these uncontrolled marked crosswalks are located on multi-lane roadways. The City's current standard is to use standard marking patterns for controlled crosswalks and triple-four marking patterns for uncontrolled crosswalks.

Standard marking pattern

Triple-four marking pattern – yellow markings denote a school zone

Curb ramps, which make crosswalks and sidewalks accessible for wheelchairs, strollers, and bikes, are provided at most intersection corners. However, there are several locations in the City that are missing curb ramps or have existing curb ramps that do not meet current standards. The Public Works department is currently developing an ADA Transition Plan that will guide allocation of funding for new curb ramps and other improvements for people with disabilities.

Curb ramp with yellow truncated domes

# COLLISION ANALYSIS

Five years of California Highway Patrol Statewide Integrate Traffic Records System (SWITRS) data for pedestrian-vehicle collisions was reviewed to identify collision locations and trends in West Sacramento. Figure 12 shows the locations of pedestrian collisions. Table 11 summarizes the collision data by year and collision severity.

**TABLE 11**
**WEST SACRAMENTO PEDESTRIAN-VEHICLE COLLISION SUMMARY**
**(JANUARY 2006 – DECEMBER 2010)**

| Year | Number of Pedestrian-Vehicle Collisions | | |
|---|---|---|---|
| | Total | Injury | Fatality |
| 2006 | 18 | 13 | 2 |
| 2007 | 19 | 14 | 0 |
| 2008 | 15 | 9 | 2 |
| 2009 | 12 | 10 | 0 |
| 2010 | 8 | 1 | 1 |
| **Total** | **72** | **47** | **5** |

Source: California Highway Patrol

The SWITRS data was also analyzed for the Primary Collision Factors (PCFs). Table 12 shows the most common PCFs for pedestrian-vehicle collisions in West Sacramento.

# Figure 12 - 5-Year Pedestrian Collisions (with Autos)

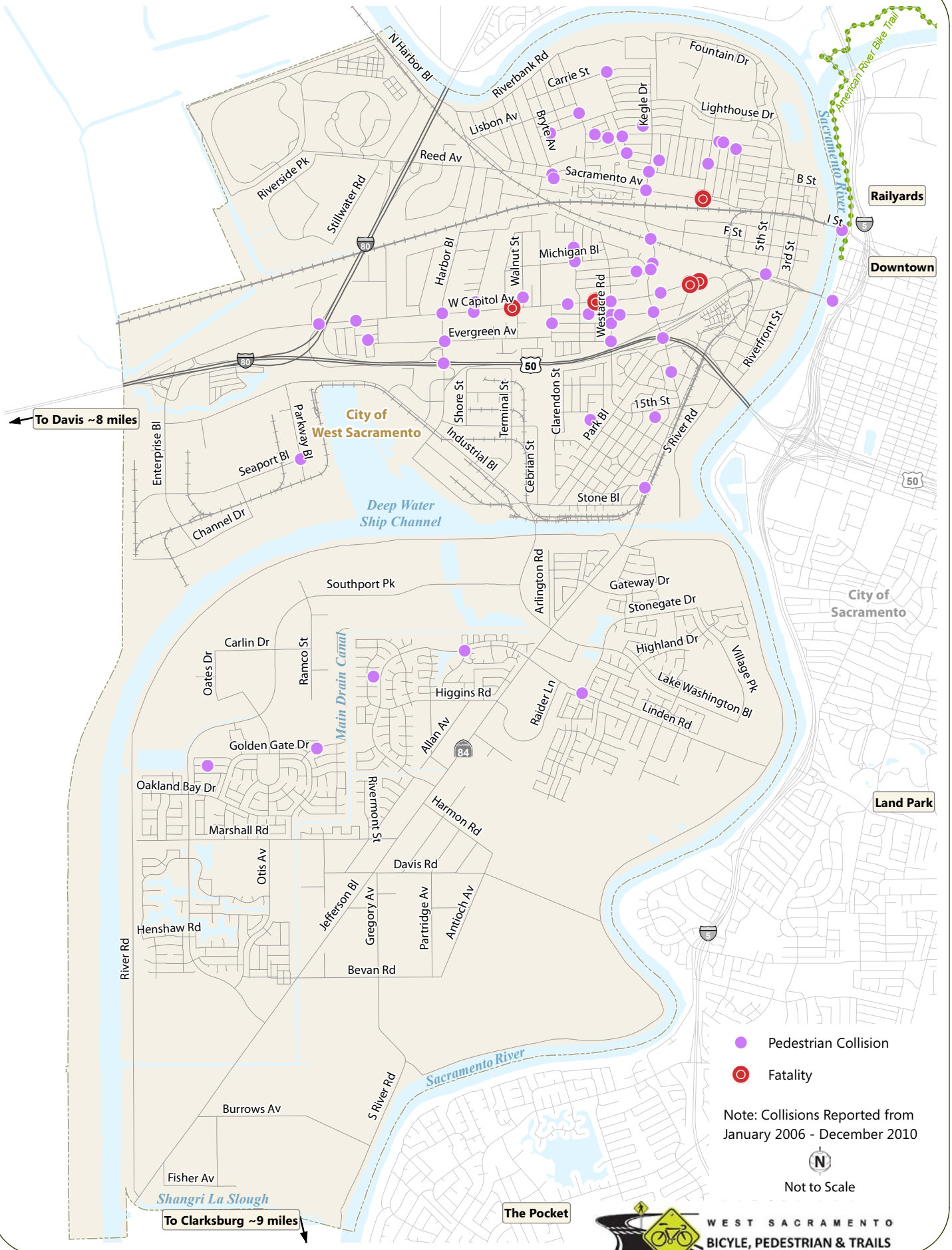


**TABLE 12**
**WEST SACRAMENTO PEDESTRIAN-VEHICLE COLLISION SUMMARY PRIMARY COLLISION FACTORS**
**(JANUARY 2006 – DECEMBER 2010)**

| Primary Collision Factor | Number of Pedestrian-Vehicle Collisions | | | |
|---|---|---|---|---|
| | Non-Injury | Injury | Fatality | Total |
| Pedestrian Violation (Pedestrian not yielding or crossing illegally) | 4 | 17 | 1 | 22 |
| Pedestrian Right of Way (Driver not yielding) | 5 | 10 | 1 | 16 |
| Unsafe Starting or Backing | 1 | 6 | 0 | 7 |
| Driving or Bicycling Under the Influence of Alcohol or Drug (Does not include pedestrians under the influence) | 2 | 2 | 1 | 5 |
| Wrong Side of Road | 1 | 4 | 0 | 5 |
| Other | 8 | 7 | 2 | 17 |

Source: California Highway Patrol

As shown in Table 12, the most common PCFs were pedestrians crossing illegally (such as crossing against a signal or midblock between signals) and drivers not yielding the right-of-way to pedestrians in crosswalks.

Table 13 shows the most common pedestrian actions, which describe what the pedestrian was doing immediately before the collision occurred, for pedestrian collisions in West Sacramento.

**TABLE 13**
**WEST SACRAMENTO PEDESTRIAN-VEHICLE COLLISION SUMMARY PEDESTRIAN ACTIONS**
**(JANUARY 2006 – DECEMBER 2010)**

| Pedestrian Action | Number of Pedestrian-Vehicle Collisions | | | |
|---|---|---|---|---|
| | Non-Injury | Injury | Fatality | Total |
| Crossing not in Crosswalk | 4 | 17 | 1 | 22 |
| Crossing in Crosswalk at Intersection | 7 | 8 | 1 | 16 |
| In Road, Including Shoulder | 2 | 11 | 0 | 13 |
| Not in Road | 1 | 3 | 0 | 4 |
| Crossing in Crosswalk not at Intersection | 0 | 0 | 2 | 2 |
| Other | 7 | 8 | 1 | 15 |

Source: California Highway Patrol

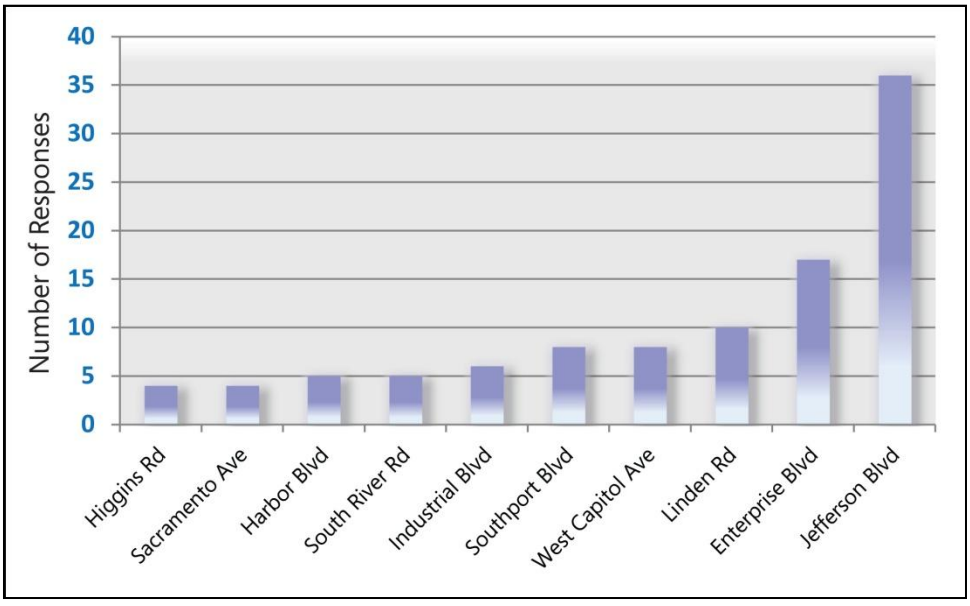
Table 13 shows that the most common pedestrian actions were "crossing not in crosswalk" and "crossing in crosswalk at intersection". Many of these collisions occurred on multi-lane roadways, including Jefferson Boulevard and West Capitol Avenue. These actions preceding a collision suggest that infrastructure enhancements, especially when paired with education and enforcement efforts, may improve pedestrian safety in West Sacramento.

SWITRS data also provides information on the lighting condition when the collision occurred. Of the 72 pedestrian-vehicle collisions studied, 68 percent occurred during daylight. Twenty-five percent of pedestrian-vehicle collisions occurred in the dark and the remaining collisions occurred during dusk or dawn.

## PUBLIC INPUT

Feedback from the public participation is valuable for further understanding the issues that affect walking in West Sacramento.

Online survey participants responded to the prompt "Identify the top three locations in West Sacramento where it is difficult to walk". The following chart shows the number of responses registered for various roadways in West Sacramento.




As shown in the above chart, Jefferson Boulevard and Enterprise Boulevard were considered the most difficult roadways to walk along or across in West Sacramento.

Online survey participants also answered the question "What keeps you from walking more often (choose all that apply)?" Table 14 shows the number and percentage of respondents for various issues that prevent walking.

**TABLE 14**
**SURVEY RESPONSE RESULTS**
**"WHAT KEEPS YOU FROM WALKING MORE OFTEN (CHOOSE ALL THAT APPLY)?"**

| Issue | Respondent Count | Respondent Percentage |
|---|---|---|
| Travel distance | 76 | 43% |
| Lack of sidewalks, promenades, or trails | 76 | 43% |
| Travel time | 65 | 37% |
| Personal security/concerns about safety | 57 | 32% |
| Unattractive scenery/surroundings | 45 | 25% |
| Difficult street crossings | 45 | 25% |
| Exposure to varying weather conditions | 43 | 24% |
| Other (please specify) | 42 | 24% |
| Darkness | 39 | 22% |
| Poor conditions of walkways or sidewalks | 37 | 21% |

Source: Fehr & Peers, 2013

# CHAPTER 7. RECOMMENDEDATIONS FOR PEDESTRIANS

## UNCONTROLLED CROSSWALK ENHANCEMENTS

Members of the public generally indicated that some uncontrolled crosswalks in West Sacramento may pose a safety concern. A detailed engineering study is necessary to determine exactly what improvements, if any, are appropriate at a particular crosswalk location. State-of-the-practice research regarding uncontrolled crosswalks includes:

- The Federal Highway Administration (FHWA) study *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* (Campbell, Feaganes, Huang, Lagerwey, Stewart, and Zegeer, 2005), also known as the "Zegeer Study"
- *National Cooperative Highway Research Program 562: Improving Pedestrian Safety at Unsignalized Crossings* (NCHRP 562) (Transportation Research Board, 2006)
- Various studies on the effectiveness of individual crossing treatments

### CHOOSING TO MARK A CROSSWALK

*Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*, also known as the "Zegeer Study", is widely recognized as one of the most relevant resources for determining marked crosswalk locations and enhancement measures. The most commonly referenced component of the FHWA study is Table 11, which makes recommendations for installing marked crosswalks based on roadway characteristics.

**Table 11. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.***

| Roadway Type (Number of Travel Lanes and Median Type) | Vehicle ADT ≤ 9,000 | | | Vehicle ADT >9,000 to 12,000 | | | Vehicle ADT >12,000–15,000 | | | Vehicle ADT > 15,000 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Speed Limit** | | | | | | | | | | | |
| | ≤ 48.3 km/h (30 mi/h) | 56.4 km/h (35 mi/h) | 64.4 km/h (40 mi/h) | ≤ 48.3 km/h (30 mi/h) | 56.4 km/h (35 mi/h) | 64.4 km/h (40 mi/h) | ≤ 48.3 km/h (30 mi/h) | 56.4 km/h (35 mi/h) | 64.4 km/h (40 mi/h) | ≤ 48.3 km/h (30 mi/h) | 56.4 km/h (35 mi/h) | 64.4 km/h (40 mi/h) |
| Two lanes | C | C | P | C | C | P | C | C | N | C | P | N |
| Three lanes | C | C | P | C | P | P | P | P | N | P | N | N |
| Multilane (four or more lanes) with raised median*** | C | C | P | C | P | N | P | P | N | N | N | N |
| Multilane (four or more lanes) without raised median | C | P | N | P | P | N | N | N | N | N | N | N |

* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

** Where the speed limit exceeds 64.4 km/h (40 mi/h), marked crosswalks alone should not be used at unsignalized locations.

*** The raised median or crossing island must be at least 1.2 m (4 ft) wide and 1.8 m (6 ft) long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

**C = Candidate sites for marked crosswalks**. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more indepth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

**P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements.** These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

**N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone.** Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

Source: *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*

Based on daily traffic volume, speed limit, and roadway type, Table 11 of the FHWA study identifies whether a site is a candidate for a marked crosswalk, there is a possible increase in pedestrian crash risk, or a marked crosswalk alone is insufficient. The City should use the recommendations of this study when determining whether or not an existing or proposed uncontrolled crosswalk is a candidate site for a marked crosswalk. The recommendations of this study are meant to inform, but not replace, engineering judgment. Therefore, site-specific characteristics may affect the determination of whether or not a location is a candidate site for a marked crosswalk.

Based on the outcome of the FHWA study, the CAMUTCD includes language recommending against installing uncontrolled marked crosswalks on certain roadways:

> *New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:*
>
> *A. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or*
> *B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.*

Pedestrian demand is an important consideration when deciding to install a new marked crosswalk and/or to enhance an existing marked crosswalk. The FHWA study states:

> *While overuse of marked crossings at uncontrolled locations should be avoided, higher priority should be placed on providing crosswalk markings where pedestrian volume exceeds about 20 per peak hour (or 15 or more elderly pedestrians and/or children per peak hour).*

### CROSSWALK ENHANCEMENT DEVICES

Where an engineering study identifies an uncontrolled location with sufficient pedestrian demand that it is not a candidate for a marked crosswalk alone, several crosswalk enhancement devices are available to improve pedestrian safety. NCHRP 562 and several independent studies on individual crossing treatments can be used to select an effective enhancement device for a variety of roadway characteristics.

In some cases where pedestrian demand is insufficient or where crosswalk enhancement devices will not provide the desired level of pedestrian safety, not marking a crosswalk (or removing a marked crosswalk) is a potential improvement option.

Appendix B includes a summary or various geometric and speed reduction treatments, enhanced signing and striping treatments, active when present treatments, and red treatments.

### CROSSWALK POLICY

Several California cities have adopted crosswalk policies that address issues pertaining to choosing to mark a crosswalk and crosswalk enhancement devices. The City of West Sacramento should consider adopting a similar policy to ensure that future crosswalk installations follow established City guidelines.

## LOCATION-SPECIFIC RECOMMENDATIONS

### JEFFERSON BOULEVARD

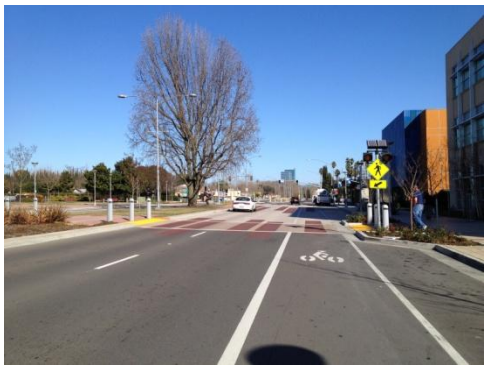
Public outreach participants most commonly cited Jefferson Boulevard as the most difficult roadway for walking in West Sacramento. North of the Deep Water Ship Channel, barriers to walking include the interchange at Capital City Freeway, missing sidewalk segments, and limited crossing locations. In Southport, there are sidewalks missing along currently undeveloped parcels.

At minimum, the City should require that new development complete sidewalk gaps along their frontage. In already developed areas, the City should include sidewalk construction in the Capital Improvement

Program (CIP). The City could also develop a Complete Streets plan to address pedestrian needs regarding the Capital City Freeway interchange and limited crossings north of the Deep Water Ship Channel.

## WEST CAPITOL AVENUE

In February 2007, the City completed the West Capitol Avenue Streetscape Master Plan. The Streetscape Master Plan identifies urban design strategies, development opportunities, and a conceptual design for the corridor between Riske Lane and Harbor Boulevard. In 2008, the City was awarded $7 million through the SACOG Community Design Program for Phase 1 of the West Capitol Avenue Streetscape Project. Those improvements are complete between Riske Lane and Jefferson Avenue.



Streetscape improvements on West Capitol Avenue

To address pedestrian access and safety on West Capitol Avenue, the City should continue to implement the recommendations of the Streetscape Master Plan. Between Glide Avenue and Jefferson Boulevard, the Streetscape Master Plan proposes a four lane roadway with no bike lanes and frontage access lanes to accommodate bicyclists and parallel parking. Given the importance of West Capitol Avenue as a bicycle transportation corridor, the City should reconsider installing bike lanes during the project's design. Additionally, west of Harbor Boulevard, the City should complete missing sidewalk segments.

## ENTERPRISE BOULEVARD

Despite being a primarily commercial/industrial street, public outreach participants commonly cited Enterprise Boulevard as one of the most difficult roadways for walking in West Sacramento. Enterprise Boulevard has an interchange with I 80 with nearby park-and-rides, provides access to highway commercial parcels south of I 80 and some single-family residences, and accesses many of West Sacramento's industrial uses. It does not feature sidewalks along much of its length or marked crosswalks at major intersections.

The City should develop a complete streets plan for Enterprise Boulevard. This plan would include targeted public outreach to Enterprise Boulevard stakeholders and directly identify and resolve perceived barriers to walking. The plan should recognize that Enterprise Boulevard primarily serves industrial land uses and that unique solutions may be required.

## RIVER CITY HIGH SCHOOL

As a part of the Safe and Healthy Routes to School Project, Safe Routes to School candidate improvements are being developed for elementary and middle schools in West Sacramento. River City High School can also benefit from improved infrastructure for walking and bicycling. Figure 13 shows candidate Safe Routes to School improvements for River City High School. Table 15 provides a description of these improvements with a cost estimate.

**TABLE 15**
**RIVER CITY HIGH SCHOOL SAFE ROUTES TO SCHOOL IMPROVEMENTS**

| Improvement | Unit | Unit Cost | Cost |
|---|---|---|---|
| 1. Add crosswalk across north leg of Jefferson Blvd. / Higgins Rd. intersection | 1 | $10,000 each | $10,000 |
| 2. Install marked crosswalk with median refuge island and Rapid Rectangular Flashing Beacon (RRFB) at Linden Rd. / Target driveway intersection; also close crosswalk at high school driveway to Linden Rd. | 1 | $25,000 each | $25,000 |
| 3. Add sidewalk on north side of Linden Rd. between the Clarksburg Branch Line Trail and Stonegate Drive | 530 feet | $110 per linear foot | $58,300 |
| 4. Add sidewalk on north side of Lake Washington Blvd. between the fire station and the Clarksburg Branch Line Trail | 400 feet | $110 per linear foot | $44,000 |
| 5. Add sidewalk on north side of Higgins Rd. between Summerfield Dr. and Paradise Way | 730 feet | $110 per linear foot | $80,300 |
| 6. Add sidewalk on south side of Higgins Rd. between Summerfield Dr. and Jefferson Blvd. | 2,350 feet | $110 per linear foot | $285,500 |
| | | **Total** | $503,100 |

Source: Fehr & Peers, 2013

# Figure 13 -River City High School Safe Routes to School Candidate Improvements


WEST SACRAMENTO
BICYLE, PEDESTRIAN & TRAILS MASTER PLAN

# CHAPTER 8. EDUCATION, ENCOURAGEMENT, AND ENFORCEMENT

In addition to implementing bicycling and walking infrastructure, the best way to increase levels of biking and walking is through programs aimed at education, encouragement, and enforcement.

## EXISTING PROGRAMS

In many cases, the City of West Sacramento will benefit most from supporting existing local and regional programs for bicycling and walking education, enforcement, and encouragement rather than to create new programs. There are several ongoing programs in the City and the Sacramento region.

### WEST SACRAMENTO SAFE AND HEALTHY ROUTES TO SCHOOL PROJECT

WALKSacramento is currently partnered with the City of West Sacramento and the Washington Unified School District to complete the Safe and Healthy Routes to School Project. The project includes walk assessments at eight local schools and programs to improve the culture of walking and biking to school in West Sacramento.

### WALK TO SCHOOL DAY AND BIKE TO SCHOOL DAY WITH WALKSACRAMENTO

Walk to School Day is held every October and Bike to School Day is held every May. Schools or school districts can individually promote Walk to School Day and Bike to School Day. Working with a local advocacy organization can be helpful for event organization and administration. Each year, WALKSacramento works with local schools to promote and administer Walk to School Day and Bike to School Day in Sacramento-area schools. On October 3rd, 2012, WALKSacramento helped with Walk to School Day at Elkhorn Village Elementary School.

### 511 – SACRAMENTO REGION TRAVEL INFORMATION

The Sacramento Area Council of Governments, SACOG, promotes 511 – Sacramento Region Travel Information. 511 includes several resources for commuter bicycling in the Sacramento region:

- Sacramento Region Bicycle Friendly Business awards
- An online Bicycle Trip Planner that gives directions from origin to destination and allows users the option to select a route that is either most bike-friendly or most direct

- Bicycle Commute Guide
- Bike maps
- Other local, regional, and statewide resources

## SMART CYCLING

Smart Cycling provides bicycling education in the Sacramento region. Their courses include several one-hour clinics, funded by the Sacramento Transportation Management Association (TMA): Smart Cycling, All-Weather Cycling, Basic Bicycle Maintenance, and Nutrition for Cyclists. Additionally, they teach Urban Cycling Skills, a three-part series of classes taught by League-Certified Instructors aimed at making bicyclists more confident and comfortable on streets. Participants who complete all three classes and an exam earn the Traffic Skills 101 certificate from the League of American Bicyclists. Several City departments, including the Police Department and Public Works, can work with the Sacramento TMA to schedule a course.

## MAY IS BIKE MONTH

Sponsored by several local agencies, May is Bike Month is a competition that challenges residents of the Sacramento region to set and achieve a mileage goal. This program motivates bicyclists of all ages and skill levels. Participants can compete on behalf of their employer, team or bike club, or school. Collectively, the goal of May is Bike Month is for the region to collectively ride over 1,000,000 miles in May.

## LIGHT ON!

The Sacramento Area Bicycle Advocates (SABA) administers the Light On! program. Through the program, SABA volunteers set up an intercept booth at night and offer free lights to bicyclists without lights.

## VALET BIKE PARKING

SABA partners with the Sacramento Metropolitan Air Quality Management District (SMAQMD) to provide valet bike parking at major events. Event organizers can hire SABA to provide bike parking. Rates range from $300 to $800 depending on event size and duration.

# CANDIDATE PROGRAMS

## BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE

Several cities in California have established a Bicycle and Pedestrian Advisory Committee (BPAC) to assist staff with the implementation of bicycle- and pedestrian-related projects and programs. BPAC members provide experience, advocacy, and advice to city departments to improve bicycle and pedestrian infrastructure. A BPAC is typically facilitated by city staff, meets once every one to two months, and is made up of residents appointed by an elected official.

## BIKE PARKING ON PRIVATE PROPERTY

Several cities in the United States encourage existing businesses to install bike parking by providing basic guidelines on rack types, installation parameters, and local bike rack manufacturers. West Sacramento could develop similar information for local businesses. The information could be added to the City Web site and distributed by volunteers. Most cities cannot install free bike racks on private property, so such an encouragement program would be a reasonable step to increase the number of businesses in West Sacramento that offer bike parking.

## MODE SHARE MONITORING PROGRAM

To better understand the effectiveness of City efforts to increase levels of walking and bicycling, the City could implement a mode share monitoring program. The program could include a stand-alone City program or the participation in a regional program. Mode share monitoring programs in other regions take many different forms; some include transportation surveys of residents and others include bicyclist and pedestrian counts at locations throughout a city or region. At minimum, the City should require that bicyclist and pedestrian volumes be counted as a part of intersection counts for traffic studies.

## EDUCATION PROGRAMS

### Adult Bicycling Education

In partnership with Smart Cycling and local bicycling organizations, the City could host Smart Cycling clinics or classes. The classes could be held in locations where they will be attended by target populations.

### Safe Routes to School Program

The Safe and Healthy Routes to School Project is currently focusing on improving the culture for walking and bicycling to school in West Sacramento. Upon the completion of this project, there will not be any ongoing Safe Routes to School efforts in West Sacramento.

Through the Federal Safe Routes to School (SRTS) Program, jurisdictions can apply for non-infrastructure projects that improve safety for bicycling or walking to school. Past examples of approved projects include bike and pedestrian safety education, the hiring of a full-time Safe Routes to School coordinator, creating a parent group to implement education programs, bike-to-school events, bike rodeos, and traffic safety assemblies.

### Safety Equipment Giveaways

Through the public outreach process, several residents indicated that some West Sacramento bicyclists often ride without helmets or at night without lights or reflective clothing. At minimum, the City could work with SABA to administer a Light On! event in West Sacramento.

Additionally, the City could distribute lights, reflective vests, and helmets to interested residents at regular fixed locations. For example, parents can pick up a bike helmet for their child at any Fresno Fire Department station. Cities often apply for local or state grants to fund safety equipment giveaways; sponsorship by local businesses may also be an option.

## ENCOURAGEMENT PROGRAMS

### May is Bike Month Event

Given the success of the existing May is Bike Month competition, the City could work with SACOG and local advocates to host a combined event for bicycling education, enforcement, and encouragement.

### Recreational Events

To encourage bicycling, walking, and running by residents, and to promote the City's network of bike paths and trails, the City could work with local organizations to host bike races, challenge rides, running races, or other events. Recreational events should be coordinated with appropriate agencies (Police Department, Public Works Department, etc.).

## ENFORCEMENT PROGRAMS

### Moving Violations

Decreasing moving violations, committed by motorists, bicyclists, and pedestrians alike, is critical to improving bicycle and pedestrian safety and encouraging all roadway users to share the road. Studies have shown that roadway users of all types are commonly unaware of laws regarding the interaction of motorists, bicyclists, and pedestrians. The City and the Police Department can apply for grants through the California Office of Traffic Safety to establish a "target week" for these types of violations. In lieu of fines, the City could develop educational diversion programs for motorists, bicyclists, and pedestrians.

### Radar Speed Signs

Radar speed signs feature a changeable message sign linked to a radar unit; the signs display a vehicle's actual speed as the vehicle approaches the sign. They can be mounted permanently to a pole or placed on a trailer (also known as a "speed trailer") and deployed on a temporary basis. Studies in the United States have shown that radar speed signs are an effective way of slowing traffic.

### Trail Watch

Similar to a Neighborhood Watch program, a Trail Watch program relies on volunteers to regularly be visibly present on the trail and report crime or maintenance issues. Anchorage, Alaska has a model program with an online interface where Trail Watch Ambassadors can submit online summaries of trail conditions and maintenance issues. Following the implementation of the Trail Watch program, 70 percent of trail users reported that the trail felt safer and more inviting because of the program.

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# CHAPTER 9. IMPLEMENTATION

## COST ESTIMATES

Unit cost estimates were developed on a linear foot basis for material costs and adjusted to account for mobilization, minor items, design fees, construction management, and contingencies. Material costs were derived from the *2011 Contract Cost Data* (Caltrans, 2011) and similar projects in Caltrans District 3 from 2010 to 2012. Right-of-way acquisition is not included in the unit cost estimates. Table 16 shows the unit cost estimates for bicycle facilities.

**TABLE 16**
**UNIT COST ESTIMATES**

| Improvement Type | Unit Cost |
|---|---|
| Class I Bike Paths – Paved | $530,000 per mile |
| Class I Bike Paths – Bridge | $1,400 per linear foot |
| Class I Bike Paths – Bridge Undercrossing | $10.5 million per mile |
| Class II Bike Lanes – Add Striping | $19,000 per mile |
| Class II Bike Lanes – Widen (w/o Curb and Gutter) | $740,000 per mile |
| Class II Bike Lanes – Widen (with Curb and Gutter) | $3.1 million per mile |
| Class III Bike Routes | $10,000 per mile |
| Unpaved Trail | $120,000 per mile |

Source: Fehr & Peers, 2013

Table 17 shows the cost estimates by bikeway type.

**TABLE 17**
**PROJECT COST ESTIMATES**

| Bikeway Classification | Cost |
|---|---|
| Class I Bike Paths | $21,023,880 |
| Class II Bike Lanes | $14,494,830 |
| Class III Bike Routes | $74,800 |
| Unpaved Trail | $224,140 |
| **Total** | $35,817,650 |

Source: Fehr & Peers, 2013

As shown in Table 17, the total capital cost for the proposed system of bikeways and trails is approximately $35.8 million.

## PRIORITIZATION

Each proposed bikeway project was prioritized based on its community benefit and feasibility. The community benefit scoring criteria were based on input received at public workshops and through the online surveys. The community benefit scoring criteria include:

- Directly accesses key destinations (schools, commercial centers, and regional destinations)
- Closure of a critical gap
- Part of the low-stress bicycling network
- Level of utilitarian use

Each community benefit scoring criterion was given an equal weight of 25 percent.

A project feasibility score was assigned according to the following standards:

- Low feasibility – long-term project requires significant roadway reconstruction or neighborhood redevelopment
- Medium feasibility – potential for short-term implementation but high costs likely
- High feasibility – potential for short-term implementation and relatively low cost

Projects were sorted according to their community benefit and feasibility scores. Appendix A provides the complete prioritization of proposed projects.

## HIGH-PRIORITY PROJECT ACTION PLAN

The following projects received high community benefit scores and high feasibility scores. Table 18 shows these high-priority projects that the City may strive to complete over the next three years.

**TABLE 18**
**HIGH-PRIORITY PROJECTS**

| Project | Limits | Mileage | Cost |
|---|---|---|---|
| **Class I Bike Path Projects** | | | |
| Class I bike path on unpaved Clarksburg Branch Line Trail | River City High School to Gregory Ave. | 2.2 | $1,166,000 |
| Class I bike path on levee along Sacramento River | I St. Bridge to River Crest Drive | 0.9 | $461,100 |
| Class I bike path around Lake Washington | Lake Washington | 1.8 | $964,600 |
| Class I bike path on Jefferson Avenue railroad bridge | Railroad bridge over Deep Water Ship Channel | 0.1 | $40,700 |
| Main Drain Parkway (includes Class I bike path and Class III bike route) | Jefferson Blvd. to Marshall Rd. | 3.5 | $1,590,000 |
| **Class II Bike Lane Projects** | | | |
| Class II bike lanes on Linden Rd. | Jefferson Blvd. to Summerfield Dr. | 0.8 | $14,500 |
| Class II bike panes on Park Blvd. | Webster St. to Jefferson Blvd. | 0.1 | $2,300 |
| Class II bike lanes on Lighthouse Dr. | Douglas St. to Fountain Dr. | 0.3 | $4,700 |
| Class II bike lanes on Gateway Dr. | Clarksburg Branch Line Trail to N. Beach Ave. | 0.1 | $2,500 |
| Class II bike lanes on Stonegate Dr. | Lake Washington Blvd. to Atherton Pl. | 0.1 | $61,000 |
| Class II bike lanes on Linden Rd | Clarksburg Branch Line Trail to Stonegate Dr. | 0.1 | $17,000 |
| Class II bike lanes on Southport Pkwy. | Otis Ave. to Jefferson Blvd. | 0.3 | $102,500 |
| **Class III Bike Route Projects** | | | |
| Westacre Rd. Bike Boulevard (Class III bike route) | Manzanita Way to Jefferson Blvd. | 1.4 | $14,200 |
| Bryte Park Bike Boulevard (Class III bike route) | Sunset Ave. to C St. | 2.3 | $22,600 |

Source: Fehr & Peers, 2013

# DESIGN STANDARDS FOR NEW BIKEWAYS

The *Guide for the Development of Bicycle Facilities* and *Highway Design Manual* (HDM) Chapter 1000, Bikeway Planning and Design, establish recommended criteria for planning and designing bikeways. The CAMUTCD Part 9, Traffic Control for Bicycle Facilities provides standards and specifications for traffic control devices on bicycle facilities.

The following design standards for different types of bikeways should apply to new bikeways in West Sacramento. These design standards were developed based on nationwide best practices and are consistent with the *Guide for the Development of Bicycle Facilities*, HDM, and CAMUTCD. In some cases, these standards reflect more stringent criteria than what is specified by these design standard/guidance documents.

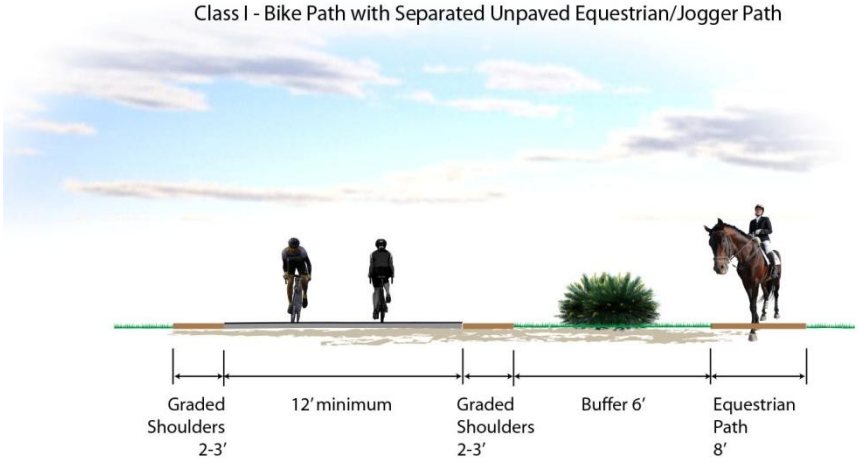
## CLASS I BIKE PATHS OR TRAILS

### Design Standards

West Sacramento's required minimum width for a Class I bike path is 12 feet; ten feet may be allowed where low use is expected. According to the HDM, the minimum paved width for a two-way bike path is eight feet. Eight feet should only be allowed where right-of-way constraints make 12 feet or ten feet infeasible. The minimum horizontal clearance to obstructions adjacent to the pavement is two feet; three feet is preferred to maximize bicyclist comfort. The pavement material and structure of a bike path should reflect local conditions and appropriate design criteria. Appropriate landscaping should be chosen to have minimal effect on pavement quality; additionally, landscaping should maintain appropriate path visibility.

Class I - Bike Path with Extra Width for Equestrians


Class I - Bike Path with Separated Unpaved Equestrian/Jogger Path




To accommodate equestrians, West Sacramento's standard is to provide a decomposed granite equestrian path along Class I bike paths wherever possible. An equestrian path width of eight feet is preferable; however, a minimum width of four feet may be allowed where right-of-way constraints make eight feet infeasible. A landscaped buffer of six feet is preferable but may be replaced by an attached shoulder where right-of-way constraints make separation infeasible. Where absolutely infeasible, Class I bike paths may only feature standard graded shoulders.

### Bike Path Design for Security

Successful Class I bike paths provide users with a high degree of personal security, which contributes to high levels of use and minimized vandalism. Because adding bike paths to regular police patrols is prohibitively expensive, it is important that bike paths be properly designed to provide high degrees of personal security. To provide high degrees of personal security, bike paths should be easily accessible to police vehicles. Additionally, they should feature good visibility from nearby roadways and land uses;

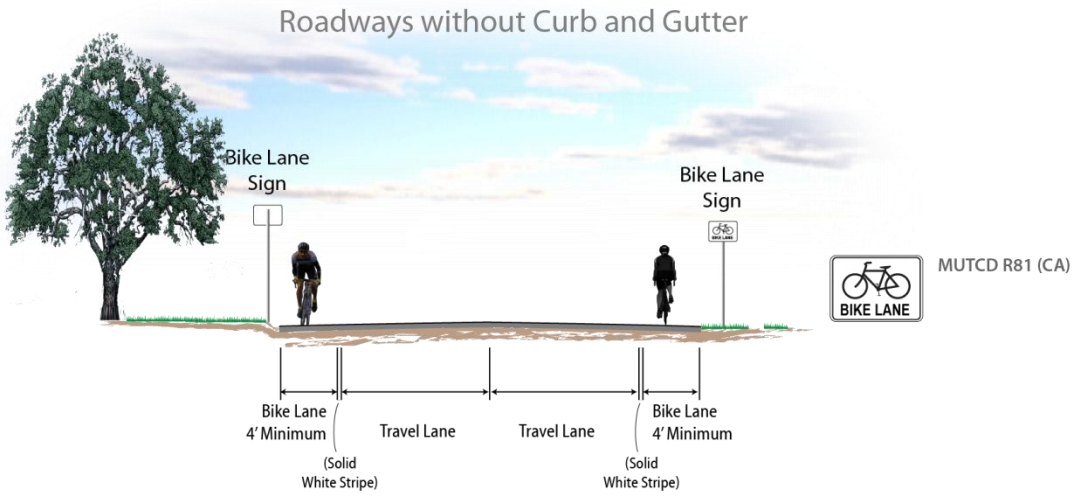
visibility can be maximized by not locating paths in isolated areas, providing adequate lighting, and regularly maintaining landscaping. Call boxes and orientation markings and signs help bike path users identify their location in the event of an emergency.

## CLASS II BIKE LANES

Design standards for Class II bike lanes vary depending on whether the roadway has curb and gutter and on-street parking. Design standards are provided for each scenario; additionally, design standards are provided for bike lanes at intersections.

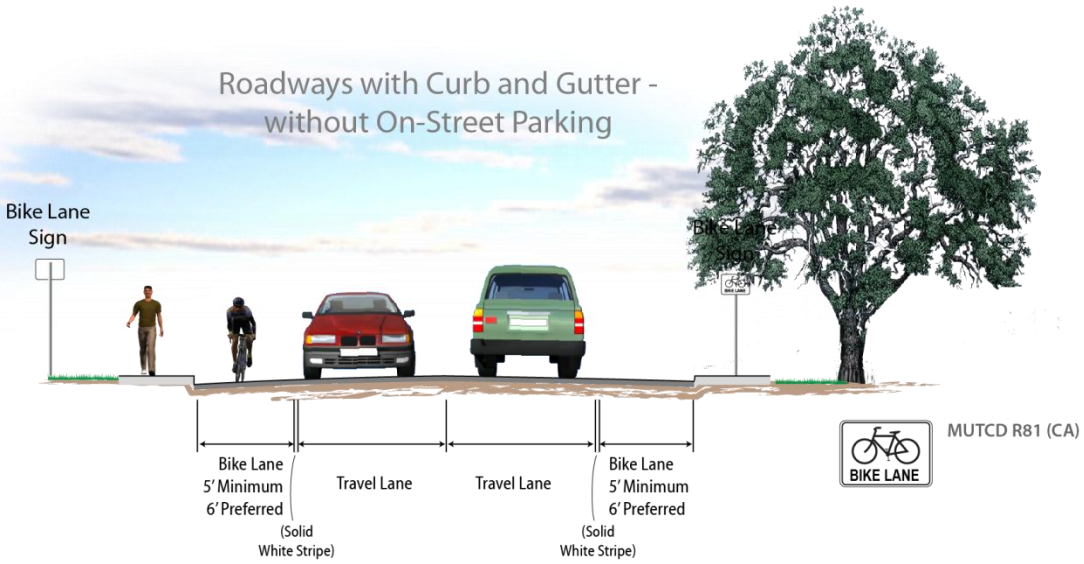
### Roadways without Curb and Gutter

On roadways without curb and gutter, the CAMUTCD requires a minimum bike lane width of four feet.




### Roadways with Curb and Gutter without On-Street Parking

On roadways with curb and gutter without on-street parking, the CAMUTCD requires a minimum bike lane width of five feet. A minimum bike lane width of six feet is preferable for bicyclist comfort since most bicyclists avoid riding on the concrete gutter.



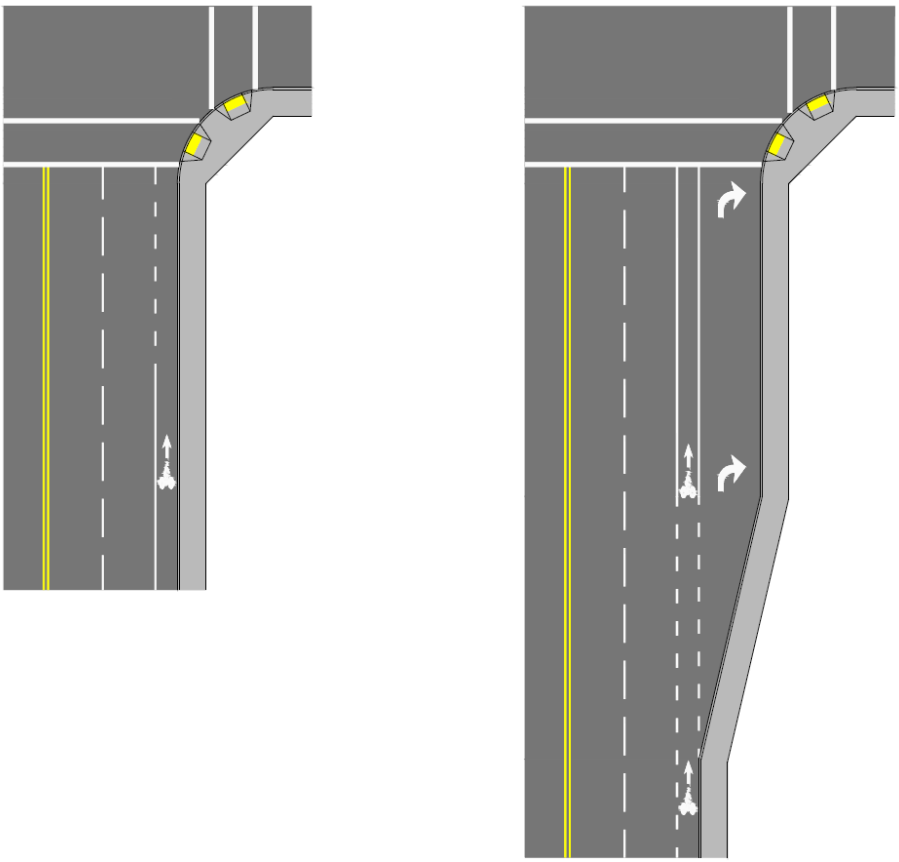

## Roadways with Curb and Gutter with On-Street Parking

On roadways with curb and gutter, the CAMUTCD requires a minimum bike lane width of five feet (with or without on-street parking). A minimum bike lane width of six to seven feet is preferable for bicyclist safety so that they can avoid riding in the cars' door zone. To accommodate a bike lane width of six feet, parallel parking stalls can be reduced to a width of seven feet. Wider bike lanes of up to seven feet are also preferable for bicyclists on high speed (greater than 45 miles per hour) or high volume roadways.

As an alternative to conventional bike lanes, the City may pursue innovative designs for buffered bike lanes that add a striped buffer between the bike lane and travel lane. The minimum recommended buffer width is two feet.

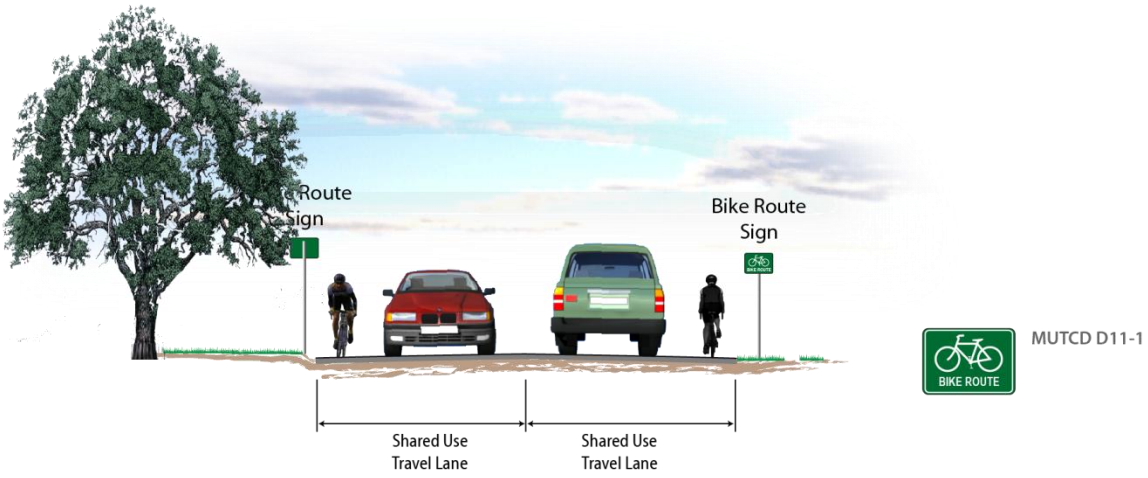
## Bike Lanes at Intersections

Bike lanes at intersections are primarily affected by the presence of right-turn lanes only for vehicles. Where no right-turn only lane is provided for vehicles, the bike lane should feature dotted lines as it approaches the intersection. According to the CAMUTCD, dotted lines are optional when a right-turn only lane is provided; however, dotted lines are preferred to emphasize the merge area for bicyclists and drivers. Bike lanes should not be discontinuous (dropped) through new intersections.



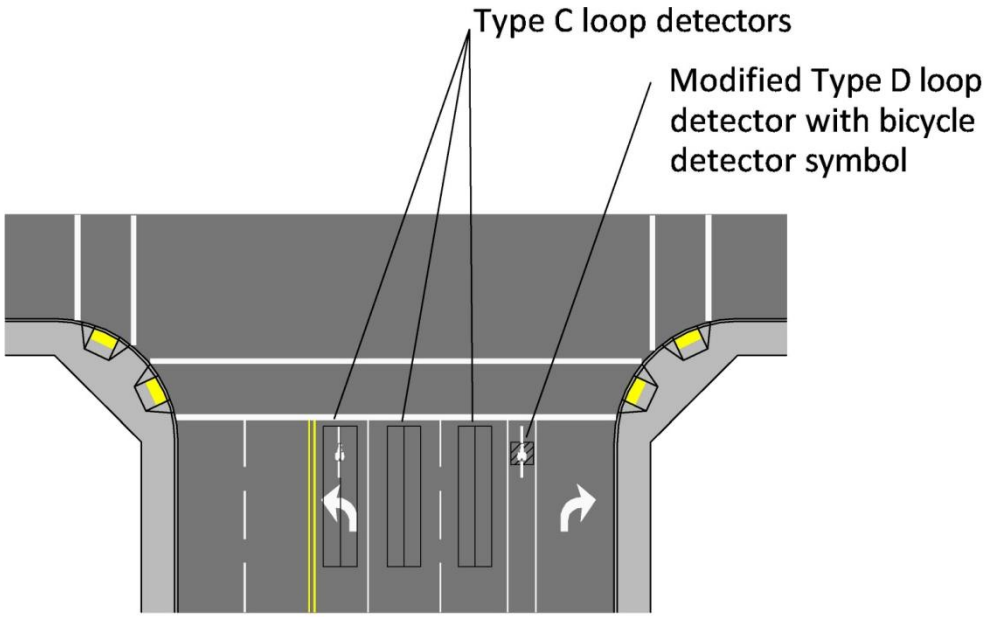
## CLASS III BIKE ROUTES

On Class III bike routes, the CAMUTCD specifies that bike route guide signs (CAMUTCD D11-1) may be repeated at regular intervals so that bicyclists entering from side streets will have an opportunity to know that they are on a bicycle route.




## BICYCLE DETECTION

The CAMUTCD requires the provision of bicycle and motorcycle detection on all new and modified approaches to traffic-actuated signals. The City has successfully used modified Type C and Type D loop detectors to detect bicyclists at intersections. Limit line detector loops should be modified Type C so that a bicyclist can be detected from any lane. Bike lanes at signalized intersections should include modified Type D loop detectors with the bicycle detector pavement marking. Outside of the bicycle lane or if not provided with a bicycle lane, bicycle detector pavement markings should indicate where to position their bicycle to activate the signal.



## GREEN COLORED PAVEMENT

In April 2011, the Federal Highway Administration (FHWA) issued an Interim Approval for the optional use of green colored pavement in marked bike lanes, extensions of bike lanes through intersections, and other traffic conflict areas. In August 2011, the FHWA Interim Approval was adopted in California.

Since the FHWA Interim Approval was issued, jurisdictions have implemented green colored pavement in bike lanes primarily according to two different criteria. Some jurisdictions have chosen to implement green colored pavement to reinforce the restricted nature of bike lanes where cross flow by vehicles is discouraged. Other jurisdictions have chosen to implement green colored pavement to highlight bike lane conflict areas, the bicycle-vehicle weaving areas near intersections. Research described in "Evaluation of blue bike lane treatment in Portland, Oregon" (Hunter, Harkey, Stewart, and Birk, 2000) showed that significantly more motorists yielded to bicyclists when approaching bike lane conflict areas when the conflict areas feature colored pavement.

In November 2011, the City of West Sacramento completed a series of streetscape improvements on Tower Bridge Gateway. Those streetscape improvements included green colored pavement in bike lanes between 5th Street and Tower Bridge. The green colored pavement in the bike lanes on Tower Bridge Gateway both reinforces areas where cross flow by vehicles is discouraged and highlights bike lane conflict areas. Additionally, the green color used on Tower Bridge Gateway is darker than the bright green used elsewhere.

Dark green colored pavement in West Sacramento


Typical bright green colored pavement in Los Angeles

In coordination with other cities in the Sacramento region, the City of West Sacramento should adopt a design standard for green colored pavement in bike lanes that either reinforces the restricted nature of bike lanes where cross flow by vehicles is discouraged or highlights conflict areas. The standard should also identify the shade of green to be used.

# PROCEDURES FOR IMPLEMENTATION

## CLASS I BIKE PATHS OR TRAILS

Each of the proposed Class I bike path or trail facilities will require a feasibility assessment for implementation. The feasibility assessment should identify or include:

- A preferred route
- Bike path or trail surface type (pavement versus aggregate)
- Proposed solutions to key roadway or waterway crossings
- Preliminary engineering and cost estimates
- Statements of stakeholder interest

Following a feasibility assessment, the City can fund project design and construction, add the cost to a schedule of development impact fees, or pursue grant funding.

## CLASS II BIKE LANES

Where Class II bike lanes are proposed, the City should require that roadways are modified to the desired standard for Class II bike lanes when various roadway projects are completed. Width for bike lanes can be acquired in two ways:

1. Add width to the existing roadway
2. Reduce the width of travel lanes on the existing roadway

Further feasibility assessment should determine the proposed implementation strategy for individual Class II bike lane projects.

# FUNDING

## FEDERAL AND STATE PROGRAMS

The majority of public funds for bicycle, pedestrian, and trails projects are derived through a core group of federal and state programs. Federal funds from the Surface Transportation Program (STP), Transportation Alternatives Program (TAP), and Congestion Mitigation Air Quality (CMAQ) programs are allocated to SACOG and distributed regionally; distribution is allocated either competitively or proportionally according to jurisdiction population.

Limited amounts from the Local Transportation Fund (LTF), which is derived from a ¼ cent of the general sales tax collected statewide, can be used for bicycle and pedestrian facilities.

The State and federal Safe Routes to School programs are potential funding sources for both bicycle and pedestrian planning and infrastructure projects that improve access to schools. Caltrans administers two Safe Routes to School programs: the state-legislated program (SR2S) and the federal program (SRTS). The federal program (SRTS) is funded though a dedicated set-aside of STP funds. Each program has unique differences that affect project selection. The SR2S and SRTS programs provide $24.25 million and $21 million, respectively, in annual funding.

Bicycle facilities can be funded through the California Bicycle Transportation Account (BTA). Annually, $7.2 million is available for projects through the BTA.

The California State Parks Recreational Trails Program provides funds annually for recreational trails and trails-related projects. Cities are eligible applicants for the approximately $5.3 million available annually. The program requires an applicant match of 12 percent of the total project cost.

Caltrans Transportation Planning Grants are available to jurisdictions and can be used for planning or feasibility studies. The maximum funding available per project is $300,000.

The Highway Safety Improvement Program (HSIP) is a core federal-aid program that aims to reduce traffic fatalities and serious injuries on public roads. Caltrans administers the program in California; in its most recent grant cycle (July 2012), Caltrans awarded $111 million to 221 projects. HSIP funds can be used for projects such as bike lanes on local roadways, improvements to Class I multi-use paths, pedestrian safety improvements, or for traffic calming measures. Applications that identify a history of incidents and demonstrate their project's improvement to safety are most competitive for funding.

The Land and Water Conservation Program, administered by the National Park Service and California State Parks, offers funds for the acquisition or development of public outdoor recreation areas and facilities. Cities are eligible applicants. Approximately $1.74 million is available annually; grants require a 50 percent local match.

## REGIONAL AND LOCAL FUNDING

SACOG administers two competitive funding programs for bicycle and pedestrian infrastructure: the Bicycle and Pedestrian Funding Program and the Community Design Funding Program.

The Bicycle and Pedestrian Funding Program funds capital and non-capital bicycle and pedestrian projects throughout the SACOG region. In 2012, SACOG awarded approximately $8 million for several Bicycle and Pedestrian Funding Program Projects.

The Community Design Funding Program provides financial assistance to member agencies for the implementation of development that is consistent with SACOG's Blueprint Principles. Eligible projects include improvements to public right-of-ways that promote smart growth. In the Program's fifth round (2011-2013), SACOG expects to award approximately $8 million for projects.

Private/local funding for pedestrian projects comes primarily from development projects, either in the form of improvements constructed directly by developers or through development fee programs.

New policies at the federal level have resulted in a series of programs that promise to provide increased funding in the coming years for bicycle projects. The HUD-DOT-EPA Interagency Partnership for Sustainable Communities has generated a series of new grant programs to-date, including Urban Circulator grants, TIGER grants, and Sustainable Communities Planning grants. DOT Secretary Ray LaHood recently announced a new DOT policy initiative, indicating "well-connected walking and bicycling networks [are] an important component for livable communities."

Table 19 shows the applicability of these various funding sources to projects, planning efforts, and programs proposed in this plan.


Tower Bridge Gateway

**TABLE 19**
**FUNDING SOURCE APPLICABILITY MATRIX**

| Funding Source | Bicycle Projects | | | Pedestrian Projects | Other Projects[1] | Planning and Programs |
|---|---|---|---|---|---|---|
| | Class I Bike Path | Class II Bike Lane | Class III Bike Route | | | |
| SACOG Bicycle & Pedestrian Funding Program | ● | ● | ● | ● | ● | ● |
| SACOG Community Design Funding Program | ● | ● | ● | ● | ● | ● |
| California Safe Routes to School (SR2S) | ● | ◒ | ◒ | ● | ● | ○ |
| Federal Safe Routes to School (SRTS) | ● | ◒ | ◒ | ● | ● | ● |
| California Bicycle Transportation Account (BTA) | ● | ● | ● | ○ | ● | ● |
| California State Parks Recreational Trails Program | ● | ○ | ○ | ○ | ○ | ○ |
| Caltrans Transportation Planning Grants | ○ | ○ | ○ | ○ | ○ | ● |
| Highway Safety Improvement Program (HSIP) Grants | ◒ | ● | ◒ | ● | ● | ○ |
| Land and Water Conservation Program | ● | ○ | ○ | ○ | ○ | ○ |

Notes:

1. Includes non-pavement elements such as signal equipment, vehicle speed feedback signs, police equipment, or crossing guard equipment

● Funding source is applicable

◒ Funding source is potentially applicable

○ Funding source is not applicable

Source: Fehr & Peers, 2013

## COORDINATION WITH SAFE ROUTES TO SCHOOL PROJECTS

Several of the proposed bikeways can be funded by Safe Routes to School programs. The City is currently development a separate Safe Routes to School Plan and should coordinate the implementation of Safe Routes to School projects with projects from this plan. In general, bikeway projects that are most competitive for Safe Routes to School funding have the following characteristics:

- Directly accesses a school
- Is part of the network of low-stress bikeways such that students and their parents will be comfortable bicycling on the facility

- Resolves a documented safety problem or safety concern
- Has strong support from school officials and nearby residents

## NEIGHBORHOOD ELECTRIC VEHICLES

A neighborhood electric vehicle (NEV) is a small, battery-electric powered personal vehicle. Unlike golf carts, NEVs are motor vehicles that can be driven on public streets with certain restrictions. NEVs are a federally-recognized sub-class of Low Speed Vehicles (LSVs); per federal requirements, they are limited to 25 miles per hour. Per *California Vehicle Code*, NEVs may be driven on roadways with a speed limit of 35 miles per hour or less. NEVs are suitable for short, local trips. The energy required to operate an NEV is substantial less than that required by a conventional automobile.

*California Vehicle Code* Sections 21250-21266 govern the use of NEVs in California. Among other restrictions, NEVs may be operated on roadways with a speed limit of 35 miles per hour or less; NEVs may cross roadways with a speed limit greater than 35 miles per hour. California Assembly Bill 2353 (Leslie) authorized the cities of Lincoln and Rocklin in Placer County to develop NEV transportation plans. Primary issues addressed by an NEV transportation plan include local NEV restrictions for certain roadways with a speed limit of 35 miles per hour or less and the designation of NEV lanes for operation on roadways with a speed limit greater than 35 miles per hour.

NEV transportation plans typically define the following types of NEV facilities:

- Class I NEV Path – provide a completely separate right-of-way for the exclusive use of NEVs, pedestrians, and bicyclists with cross-flow minimized
- Class II NEV/Bike Lane – separate, striped lanes adjacent to traffic
- Class III NEV Route – shared use with automobile traffic on streets with a posted speed limit of 35 mph or less

NEV facilities have definitions similar to bike facilities. However, the applicable design standards for NEV facilities are typically in excess of the standards that apply for bike facilities. NEV paths and NEV/bike lanes are typically wider than standard bike paths and bike lanes.

To encourage NEV use in the City of West Sacramento, the City should develop and adopt an NEV transportation plan. The plan should address any desired NEV restrictions on roadways with a speed limit of 35 miles per hour or greater. It should also define the locations of NEV paths and NEV/bike lanes so that the proposed infrastructure can be constructed to the desired design standard.

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# Appendix A: Priority Lists

West Sacramento Bicycle, Pedestrian, and Trails Master Plan - Draft
Proposed Class I Bike Path Projects

| Improvement | Improvement Type | Location | Limits | Distance (mi) | Cost Type | Unit Cost per Mile | Facility Cost | Benefit | Feasibility |
|---|---|---|---|---|---|---|---|---|---|
| Convert Unpaved Clarksburg Branch Line Trail to Class I Bike Path | Class I Bike Path | Clarksburg Branch Line Trail | Jefferson Blvd to S. River Rd | 3.42 | Class I Paved | $530,000 | $1,812,600 | Med | High |
| Sacramento River Northeast Class I Bike Path | Class I Bike Path | Co Rd 136/Levee Rd | 1st St to River River Crest Dr | 0.87 | Class I Paved | $530,000 | $461,100 | Med | High |
| Class I Bike Path around Lake Washington | Class I Bike Path | Lake Washington | Deep Water Ship Channel to Main Drain Canal | 1.82 | Class I Paved | $530,000 | $964,600 | Low | High |
| Jefferson Blvd Railroad Bridge Class I Bike Path | Class I Bike Path | Jefferson Blvd Railroad Bridge | Across Deep Water Ship Channel | 0.08 | Class I Paved | $530,000 | $40,670 | Med | Med |
| Main Drain Trail Class I Bike Path | Class I Bike Path | Main Drain Canal (does not include existing segment of unpaved trail) | Lake Washington Blvd to Deep Water Ship Channel south end of town) | 3.91 | Class I Paved | $530,000 | $2,072,300 | Med | Med |
| Convert Unpaved Deep Water Ship Channel Path to Class I Bike Path | Class I Bike Path | Deep Water Ship Channel | Jefferson Blvd to Industrial Blvd | 0.40 | Class I Paved | $530,000 | $212,000 | Med | Med |
| Convert Unpaved Main Drain Trail to Class I Bike Path | Class I Bike Path | Main Drain Trail | Catalina Island Rd to Golden Gate Dr | 0.76 | Class I Paved | $530,000 | $402,800 | Low | Med |
| Class I Bike Path East on Utility Eastment in Liberty | Class I Bike Path | Utility Easement | Davis Rd to Clarksburg Branch Line Trail | 0.45 | Class I Paved | $530,000 | $238,500 | Low | Med |
| Class I Bike Path adjacent to Davis Rd from Clarksburg Branch Line Trail to Sacramento River Levee Rd | Class I Bike Path | Davis Rd | Clarksburg Branch Line Trail to Sacramento River Levee Rd | 0.72 | Class I Paved | $530,000 | $381,600 | Low | Med |
| Class I Bike Path connecting Silverwood Drive to Deep Water Ship Channel Bike Path | Class I Bike Path | Silverwood Drive cul-de-sac | Silverwood Drive to Deep Water Ship Channel | 0.05 | Class I Paved | $530,000 | $26,500 | Low | Med |
| Deep Water Ship Channel Class I  Bike Path | Class I Bike Path | River Road (Deep Water Shipping Channel) | Marshall Rd to South end of Proposed Main Drain Trail | 1.30 | Class I Paved | $530,000 | $689,000 | Low | Med |
| Deep Water Ship Channel Class I  Bike Path | Class I Bike Path | River Road (Deep Water Shipping Channel) | South end of Proposed Main Drain Trail to Clarksburg Branch Line Trail | 1.97 | Class I Paved | $530,000 | $1,044,100 | Low | Med |
| Class I Bike Path Underneath Railroad Tracks | Class I Bike Path | Underneath Railroad Tracks | Manzanita Way to Yolo St | 0.11 | Class I Paved | $530,000 | $618,300 | High | Low |
| Sewer Easement Class I Bike Path | Class I Bike Path | Existing Sewer Easement | Rice Ave to Park Blvd | 1.70 | Class I Paved | $530,000 | $1,531,000 | High | Low |
| Class I Bike Route on New C St Bridge (I Street Bridge Replacement) | Class I Bike Path | C St | 3rd St across New Bridge | 0.11 | Class I Paved | $530,000 | $55,710 | High | Low |
| Class I Bike Path under I St Bridge | Class I Bike Path | Under I Street Bridge | 1st St to Co Rd 136/Levee Rd | 0.10 | Class I Paved Railroad Undercrossing | $10,560,000 | $1,056,000 | High | Low |
| Class I Bike Path under Tower Bridge Gateway | Class I Bike Path | Under Tower Bridge Gateway | River Walk Trail to River Walk Trail | 0.10 | Class I Paved Railroad Undercrossing | $10,560,000 | $1,056,000 | High | Low |
| Class I Bike Path over Sacramento River | Class I Bike Path | Sacramento River | River Park Walk to R Street Bridge | 0.15 | Class I Paved | $530,000 | $1,185,500 | High | Low |
| Pioneer Bluff Class I Bike Path | Class I Bike Path | Along Sacramento River within Pioneer Bluff Planning Area | Jefferson Blvd Railroad Bridge to Existing River Walk Trail | 1.27 | Class I Paved | $530,000 | $673,100 | Med | Low |
| Class I Bike Path on New Broadway Bridge | Class I Bike Path | Broadway | S River Road to Sacramento City Limits | 0.27 | Class I Paved | $530,000 | $143,100 | Med | Low |
| Class I Bike  Path adjacent to Proposed Village Pkwy from Clarksburg Branch Line Trail to Jefferson Blvd | Class I Bike Path | Proposed Village Pkwy | Clarksburg Branch Line Trail to Jefferson Blvd | 1.05 | Class I Paved | $530,000 | $556,500 | Low | Low |
| Northwest Bike Path | Class I Bike Path | Tule Sake Rd/Rd 127 | N. Harbor Blvd to I-80 | 2.90 | Class I Paved | $530,000 | $2,342,000 | Low | Low |
| Sacramento River Levee Road Class I Bike Path (North) | Class I Bike Path | Sacramento River Levee Road (N) | Jefferson Blvd to Davis Rd | 3.36 | Class I Paved | $530,000 | $1,780,800 | Low | Low |
| Sacramento River Levee Road Class I Bike Path (South) | Class I Bike Path | Sacramento River Levee Road (S) | Davis Rd to West Sacramento City Limit (Southeast) | 3.17 | Class I Paved | $530,000 | $1,680,100 | Low | Low |

West Sacramento Bicycle, Pedestrian, and Trails Master Plan - Draft
Proposed Class II Bike Lane Projects

| Improvement | Improvement Type | Location | Limits | Distance (mi) | Cost Type | Unit Cost per Mile | Facility Cost | Benefit | Feasibility |
|---|---|---|---|---|---|---|---|---|---|
| Class II Bike Lanes on Park Blvd from Webster St to Jefferson Blvd | Class II Bike Lanes | Park Blvd | Webster St to Jefferson Blvd | 0.12 | Class II Restripe | $19,000 | $2,250 | High | High |
| Class II Bike Lanes on Linden Rd | Class II Bike Lanes | Linden Rd | Jefferson Blvd to Summerfield Dr | 0.76 | Class II Restripe | $19,000 | $14,440 | High | High |
| Convert Class III Bike Route to Class II Bike Lanes on Lighthouse Dr from Douglas St to Fountain Dr | Class II Bike Lanes | Lighthouse Dr | Douglas St to Fountain Dr | 0.25 | Class II Restripe | $19,000 | $4,710 | Med | High |
| Class II Bike Lanes on Gateway Dr from Clarksburg Branch Line Trail to N. Beach Ave | Class II Bike Lanes | Gateway Dr | Clarksburg Branch Line Trail to N. Beach Ave | 0.08 | Class II Restripe | $19,000 | $1,520 | Med | High |
| Class II Bike Lanes on Stonegate Dr north of Lake Washington Blvd | Class II Bike Lanes | Stonegate Dr | Lake Washington Blvd to existing bike lanes north | 0.08 | Class II Widen (No Curb/Gutter) | $740,000 | $61,010 | Med | High |
| Class II Bike Lane on Linden Rd (North Side) from Clarksburg Branch Line Trail to Stonegate Dr | Class II Bike Lanes | Linden Rd (N Side) | Clarksburg Branch Line Trail to Stonegate Dr | 0.05 | Class II Widen (No Curb/Gutter) | $370,000 | $17,060 | Med | High |
| Class II Bike Lanes on Southport Pkwy from Otis Ave to Jefferson Blvd | Class II Bike Lanes | Southport Pkwy | Otis Ave to Jefferson Blvd | 0.27 | WB - Class II Restripe, EB - Class II Widen (No Curb/Gutter) | $380,000 | $102,500 | Med | High |
| Class II Bike Lanes on 15th St from Jefferson Blvd to 5th St | Class II Bike Lanes | 15th St | Jefferson Blvd to 5th St | 0.10 | Class II Restripe | $19,000 | $1,950 | Low | High |
| Class II Bike Lanes on Michigan Blvd from Rockrose Rd to Jefferson Blvd | Class II Bike Lanes | Michigan Blvd | Rockrose Rd to Jefferson Blvd | 0.03 | Class II Widen (With Curb/Gutter) | $3,100,000 | $91,530 | High | Med |
| Class II Bike Lane on Lake Washington Blvd (South Side) from Jefferson Blvd to Stonegate Dr | Class II Bike Lanes | Lake Washington Blvd (S Side) | Shopping center driveway to Stonegate Dr | 0.12 | Class II Restripe | $9,500 | $1,140 | High | Med |
| Class II Bike Lanes on 5th St from Mill St to South River Road | Class II Bike Lanes | 5th St | Mill St to South River Rd | 0.11 | Class II Widen (With Curb/Gutter) | $3,100,000 | $341,000 | High | Med |
| Class II Bike Lanes on 5th St from A St to Tower Bridge Gateway | Class II Bike Lanes | 5th St | A St to Tower Bridge Gateway | 0.64 | Class II Widen (With Curb/Gutter) | $3,100,000 | $1,984,540 | Med | Med |
| Convert Class III Bike Route to Class II Bike Lanes on C St from 6th St to 3rd St | Class II Bike Lanes | C St | 6th St to 3rd St | 0.21 | Class II Widen (With Curb/Gutter) | $3,100,000 | $656,620 | Med | Med |
| Class II Bike Lanes on Garden St from Tower Bridge Gateway to 5th St | Class II Bike Lanes | Garden St | Tower Bridge Gateway to 5th St | 0.34 | Class II Widen (No Curb/Gutter) | $740,000 | $248,190 | Med | Med |
| Convert Class III Bike Route to Class II Bike Lanes on Southport Pkwy from Lake Washington Blvd to Main Canal | Class II Bike Lanes | Southport Pkwy | Lake Washington Blvd to Main Canal (east of Ramco St) | 1.00 | Class II Widen (No Curb/Gutter) | $740,000 | $740,690 | Med | Med |
| Class II Bike Lanes on Reed Ave from Riverside Pkwy to Harbor Blvd | Class II Bike Lanes | Reed Ave | Riverside Pkwy to Harbor Blvd | 0.93 | Class II Restripe | $19,000 | $17,640 | Med | Med |
| Class II Bike Lanes on S. River Rd from 15th St to Culdasac End | Class II Bike Lanes | S. River Rd | 15th St to Culdasac End | 0.71 | Class II Widen (No Curb/Gutter) | $740,000 | $521,950 | Med | Med |
| Class II Bike Lane on Village Pkwy (East Side) from Jefferson Blvd to Stonegate Dr | Class II Bike Lanes | Village Pkwy (E Side) | Elk Valley St to Lake Washington Blvd | 0.26 | Class II Widen (With Curb/Gutter) | $1,550,000 | $397,840 | Med | Med |
| Class II Bike Lane on Lake Washington Blvd (South Side) from Redwood Ave to Village Pkwy | Class II Bike Lanes | Lake Washington Blvd (S Side) | Redwood Ave to Village Pkwy | 0.19 | Class II Widen (With Curb/Gutter) | $1,550,000 | $295,180 | Med | Med |
| Class II Bike Lanes on Industrial Blvd from Harbor Blvd to Terminal St | Class II Bike Lanes | Industrial Blvd | Harbor Blvd to Terminal St | 0.43 | Class II Widen (No Curb/Gutter) | $740,000 | $321,050 | Low | Med |
| Class II Bike Lanes on Jefferson Blvd from Harmon Rd to Gregory Ave | Class II Bike Lanes | Jefferson Blvd | Harmon Rd to Gregory Rd | 0.46 | Class II Restripe | $19,000 | $8,740 | Low | Med |
| Class II Bike Lanes on Jefferson Blvd from Gregory Rd to West Sacramento City Limit (Southwest) | Class II Bike Lanes | Jefferson Blvd | Gregory Rd to West Sacramento City Limit (Southwest) | 0.36 | Class II Widen (No Curb/Gutter) | $740,000 | $266,400 | Low | Med |
| Class II Bike Lanes on Enterprise Blvd from I-80 WB Ramps to Channel Dr | Class II Bike Lanes | Enterprise Blvd | I-80 WB Ramps to Channel Dr | 1.22 | Class II Restripe | $19,000 | $23,270 | Low | Med |
| Class II Bike Lanes on New C St Bridge (I Street Bridge Replacement) | Class II Bike Lanes | C St | 3rd St across New Bridge | 0.33 | Class II Widen (No Curb/Gutter) | $740,000 | $242,440 | High | Low |
| Class II Bike Lanes on Jefferson Blvd from W. Capitol Ave to Webster St | Class II Bike Lanes | Jefferson Blvd | W. Capitol Ave to Webster St | 0.41 | Class II Widen (With Curb/Gutter) | $3,100,000 | $1,267,430 | Med | Low |
| Class II Bike Lanes on Village Pkwy Extension from S. River Rd to Stonegate Dr | Class II Bike Lanes | Village Pkwy Extension | S. River Rd to Stonegate Dr | 0.54 | Class II Widen (No Curb/Gutter) | $740,000 | $398,440 | Med | Low |
| Class II Bike Lanes on Harbor Blvd from W. Capitol Ave to Industrial Blvd | Class II Bike Lanes | Harbor Blvd | W. Capitol Ave to Industrial Blvd | 0.68 | Class II Widen (With Curb/Gutter) | $3,100,000 | $2,108,000 | Med | Low |
| Class II Bike Lanes on Stonegate Dr Extension from Hoopa Rd to Davis Rd | Class II Bike Lanes | Stonegate Dr Extension | Hoopa Rd to Davis Rd | 0.55 | Class II Widen (No Curb/Gutter) | $740,000 | $406,350 | Med | Low |
| Class II Bike Lanes on New Broadway Bridge | Class II Bike Lanes | Broadway | South River Rd to Broadway | 0.27 | Class II Widen (No Curb/Gutter) | $740,000 | $199,800 | Med | Low |
| Class II Bike Lanes on Enterprise Blvd Extension from Channel Dr to Southport Pkwy | Class II Bike Lanes | Enterprise Blvd Extension | Channel Dr to Southport Pkwy | 0.68 | Class II Widen (No Curb/Gutter) | $740,000 | $505,330 | Low | Low |
| Class II Bike Lanes on Linden Rd from Spruce St to Sacramento River Levee Rd | Class II Bike Lanes | Linden Rd | Spruce Way to Sacramento River Levee Rd | 0.74 | Class II Widen (No Curb/Gutter) | $740,000 | $544,600 | Low | Low |
| Class II Bike Lanes on Proposed Village Pkwy from Lake Washington Blvd to Davis Rd | Class II Bike Lanes | Proposed Village Pkwy | Lake Washington Blvd to Davis Rd | 1.57 | Class II Widen (No Curb/Gutter) | $740,000 | $1,158,440 | Low | Low |

West Sacramento Bicycle, Pedestrian, and Trails Master Plan - Draft
Proposed Class II Bike Lane Projects

| Improvement | Improvement Type | Location | Limits | Distance (mi) | Cost Type | Unit Cost per Mile | Facility Cost | Benefit | Feasibility |
|---|---|---|---|---|---|---|---|---|---|
| Class II Bike Lanes on Proposed Village Pkwy from Davis Rd to Clarksburg Branch Line Trail | Class II Bike Lanes | Proposed Village Pkwy | Davis Rd to Clarksburg Branch Line Trail | 0.95 | Class II Widen (No Curb/Gutter) | $740,000 | $700,820 | Low | Low |
| Class II Bike Lanes on Proposed Village Pkwy from Clarksburg Branch Line Trail to Jefferson Blvd | Class II Bike Lanes | Proposed Village Pkwy | Clarksburg Branch Line Trail to Jefferson Blvd | 1.14 | Class II Widen (No Curb/Gutter) | $740,000 | $841,960 | Low | Low |

West Sacramento Bicycle, Pedestrian, and Trails Master Plan - Draft
Proposed Class III Bike Route Projects

| Improvement | Improvement Type | Location | Limits | Distance (mi) | Cost Type | Unit Cost per Mile | Facility Cost | Benefit | Feasibility |
|---|---|---|---|---|---|---|---|---|---|
| Westacre Class I Bike Boulevard | Class III Bike Route | Westacre Rd, 15th St | Manzanita Way to Jefferson Blvd | 1.42 | Class III | $10,000 | $14,200 | High | High |
| Bryte Park Bike Boulevard | Class III Bike Route | Lisbon Ave, Todhunter Ave, Anna St, Arthur Dr, Cummins Way, 6th St | Sunset Ave to C St | 2.26 | Class III | $10,000 | $22,570 | High | High |
| Class III Bike Route on Todhunter Ave from Riverbank Rd to Lisbon Ave | Class III Bike Route | Todhunter Ave | Riverbank Rd to Lisbon Ave | 0.28 | Class III | $10,000 | $2,750 | High | High |
| Class III Bike Route on Kegle Dr from Cummins Way to Fremont Blvd | Class III Bike Route | Kegle Dr | Cummins Way to Fremont Blvd | 0.20 | Class III | $10,000 | $2,010 | Med | High |
| Class III Bike Route on Rockrose Rd from Westacre Rd to Michigan Blvd | Class III Bike Route | Rockrose Rd | Westacre Rd to Michigan Blvd | 0.20 | Class III | $10,000 | $2,030 | Med | High |
| Class III Bike Route on Arlington Road | Class III Bike Route | Arlington Rd | Main Drain Trail to Lake Washington Blvd | 0.44 | Class III | $10,000 | $4,400 | Med | High |
| Class III Bike Route on Riverbank Road from N. Harbor Blvd to Todhunter Ave | Class III Bike Route | Riverbank Road | N. Harbor Blvd to Todhunter Ave | 0.68 | Class III | $10,000 | $6,820 | Low | High |
| Class III Bike Route on Catalina Island Rd from Golden Date Dr to Unpaved Main Drain Trail | Class III Bike Route | Catalina Island Rd | Golden Date Dr to Unpaved Main Drain Trail | 0.27 | Class III | $10,000 | $2,720 | Low | High |
| Class III Bike Route on N. Harbor Blvd from Sacramento Ave/Reed Ave to West Sacramento City Limit (Northwest) | Class III Bike Route | N. Harbor Blvd | Sacramento Ave/Reed Ave to West Sacramento City Limit (Northwest) | 0.93 | Class III | $10,000 | $9,330 | Low | High |
| Convert Class II Bike Lanes to Class III Bike Route on W. Capitol Ave from Glide Ave to Westacre Rd | Class III Bike Route | W. Capitol Ave | Glide Ave to Westacre Rd | 0.80 | Class III | $10,000 | $7,970 | High | Low |

West Sacramento Bicycle, Pedestrian, and Trails Master Plan - Draft
Proposed Unpaved Trail Projects

| Improvement | Improvement Type | Location | Limits | Distance (mi) | Cost Type | Unit Cost per Mile | Facility Cost | Benefit | Feasibility |
|---|---|---|---|---|---|---|---|---|---|
| Unpaved Trail on Marshall Rd (South Side) from River Rd (W) to Jefferson Blvd | Unpaved Trail | Marshall Rd (S Side) | River Rd (W) to Jefferson Blvd | 1.01 | Bike Trail Unpaved | $120,000 | $120,940 | Low | High |
| Unpaved Trail on Jefferson Rd (East Side) from Marshall Rd to Davis Rd | Unpaved Trail | Jefferson Blvd (E Side) | Marshall Rd to Davis Rd | 0.23 | Bike Trail Unpaved | $120,000 | $27,600 | Low | Med |
| Unpaved Trail on Davis Rd from Jefferson Blvd to Clarksburg Branch Line Trail | Unpaved Trail | Davis Rd | Jefferson Blvd to Clarksburg Branch Line Trail | 0.63 | Bike Trail Unpaved | $120,000 | $75,600 | Low | Med |

# Appendix B: Pedestrian Safety Treatments

## TABLE 1: GEOMETRIC AND SPEED REDUCTION TREATMENTS


Four lanes converted to two lanes with center two-way left-turn lane


Three lanes one-way converted to two lanes one-way with bike lanes on both sides

### Fewer Travel Lanes ("Road Diet") and Lane Narrowing

Fewer travel lanes decrease the unprotected crosswalk length and reduce or eliminate "multiple treat" conditions for pedestrians crossing more than one lane of traffic in each direction. It takes an average pedestrian almost four seconds to cross each additional travel lane. Therefore, reducing the number of travel lanes minimizes the amount of time that pedestrians are in the crosswalk. More travel lanes than necessary can also increase vehicle travel speeds. Research demonstrates that the severity of pedestrian collisions increases with vehicle travel speed.

FHWA cites the following benefits from road diets: reduced rear-end and sideswipe crashes; improved speed limit compliance; decreased crash severity; and, improved buffer space between pedestrians and vehicles with the introduction of bike lanes and/or on-street parking.[20]

Where fewer travel lanes are not possible, narrower lanes may be considered, especially left- and right-turn pockets. For example, where travel lanes are wider than necessary, travel lane width may be reduced to the minimum required and the excess pavement could be striped for on-street bicycle lanes or parking Narrower travel lanes decrease the unprotected crosswalk length.

FHWA suggests that roadways with ADT of 20,000 or less may be good candidates for a road diet.[20]

### Curb Extension

Curb extensions can be installed at intersections or mid-block to extend the curb and pedestrian space further into the roadway, shortening the length of the crosswalk. They act as a traffic calming device by narrowing the effective width of the roadway. They extend into the roadway to improve visibility for both pedestrians and roadway users. Curb extensions prevent parked cars from encroaching into the crosswalk area. Curb extensions can be constructed to accommodate ADA improvements, such as directional curb ramps. The City's preference is to use a design that provides a continuous curb.

## TABLE 1: GEOMETRIC AND SPEED REDUCTION TREATMENTS

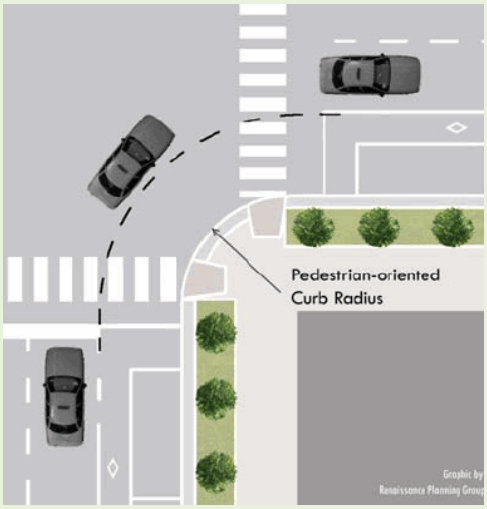


Image Source: AARP

**Reduced Turning Radius**

Vehicles travel faster through turns with a large turn radius than turns with a small curb radius. Reducing the radius of a corner curb is an effective way of reducing vehicle speeds. Where on-street parking is permitted on one or both streets, consideration for further reductions of radii should occur acknowledging that the effective radius is increased with on-street parking. Corner curb radii should accommodate design vehicle (i.e., truck) turning movements appropriate for the roadway type.

**Pedestrian Median Refuge Island**

Raised islands are placed in the center of the roadway separating opposing lanes of traffic with cutouts for accessibility along the pedestrian path. Median refuge islands are recommended where right-of-way and built-environment conditions allow. Islands benefit the pedestrian by facilitating crossing one direction of the street at a time. Island installation may limit left turn movements to or from the side street depending on the lane configuration.

The AASHTO Ped Guide suggests that median islands should be at least six feet wide to accommodate more than one pedestrian and to provide two feet of detectable warning at both sides of the island.[18]

FHWA cites that providing raised medians can significantly reduce pedestrian crash rates.[21] Further, FHWA suggests medians and pedestrian refuge areas in urban and suburban areas as one of the top nine safety countermeasures.

The following motorist (yield) compliance findings are from the NCHRP 562 study: two lane street (approximately 75%); and, four lane street (approximately 7 – 50%).[9]

## TABLE 1: GEOMETRIC AND SPEED REDUCTION TREATMENTS

Bellevue, Washington
Image Source: pedbikeimages.org; D. Burden

**Split Pedestrian Crossover Median Refuge Island**

This measure is similar to a traditional pedestrian median refuge island with the difference being that the crosswalks in the roadway are staggered such that a pedestrian crosses half of the street and then walks toward traffic or on an angle to reach the second half of the crosswalk. This strategy is well suited for off-set intersections and skewed crosswalk alignments where an extended median can be used to align the crosswalks perpendicular to traffic vehicle traffic.

**Raised Crosswalk**

Raised crosswalks are speed tables (flat-topped speed humps) outfitted with crosswalk markings and signage, providing pedestrians with a level street crossing. By raising the level of the crossing, vehicles drive more slowly through the crosswalk and pedestrians are more visible to approaching motorists. Raised crosswalks can make sidewalks accessible without adding curb ramps.

Raised crosswalks are suitable only on streets with a posted speed limit of 35mph or less and an ADT of 7,500 or less.[7]

Consideration of intersection turning movements, emergency and transit vehicles access and drainage may limit applicability on certain roadways.

**TABLE 1: GEOMETRIC AND SPEED REDUCTION TREATMENTS**

**Pedestrian Overcrossing/Undercrossing (Grade Separation)**

Pedestrian overcrossings and undercrossings allow for the uninterrupted flow of pedestrian movement separate from the vehicle traffic. They may be the best or only option to connect pedestrians with their desired destinations. Generally, pedestrian/bicycle overcrossings work best when they overcome major barriers hindering direct travel between origins (e.g., residential neighborhoods) and destinations (e.g., schools, commercial areas, and transit stops).[18]

This measure must be designed to accommodate all pedestrians as required by the ADA. The use of ramps to achieve the required grade can result in long crossing distances and additional time that may discourage use.

Actual pedestrian use of an overcrossing or undercrossing depends on a range of physical attributes. Listed below are some considerations.

- Pedestrians may not use a grade separation if a nearby street-level crossing is available that will save time.
- The use of extensive ramping may discourage use. Grade separations are best suited where site topography lends itself to a more level pedestrian crossing.
- Pedestrians may have perceived or actual personal security concerns regarding grade-separated structures. Care should be taken to design facilities that have an open feel with adequate lighting.

Grade separated facilities are extremely high-cost, and overcrossings can be visually intrusive.

## TABLE 1: GEOMETRIC AND SPEED REDUCTION TREATMENTS

**Free Right-Turn Lane Design**

Free right-turns allow vehicles to turn right at higher speeds. Where vehicles are not controlled by a traffic signal or other control, pedestrians cross a free right-turn lane as an uncontrolled crosswalk. Controlled right-turn movements are preferable for pedestrians because they require a vehicle to stop on red before turning right. However, if free right-turns are necessary for operational or other reasons, appropriate geometric treatments like “pork chop” islands, raised crosswalks and signing and striping may be provided to enhance pedestrian safety.

## TABLE 2: ENHANCED SIGNING AND STRIPING TREATMENTS

### High Visibility Marking

Uncontrolled crosswalks should feature high-visibility markings. The City's striping pattern for high-visibility crosswalks is the "triple four". CA MUTCD Section 3B.18 contains provisions for the placement and characteristics of a marked crosswalk.[1]

The City standard is to use a triple four crosswalk with the associated "SLOW PED XING" pavement markings. W11-2 and W16-7p signs should be placed at all marked uncontrolled crosswalks. In addition, the City's practice is to use W11-2 warning signs in advance of uncontrolled marked crosswalks.

R1-5

R1-5a

Image Source: CA MUTCD (2012)

### Advanced Yield Line

Advanced yield lines, often referred to as "sharks teeth", are used at marked, uncontrolled crosswalks on multi-lane roadways. Their intention is to identify where vehicles should stop when yielding to a pedestrian. They improve sight lines for both the pedestrian and driver.

CA MUTCD Section 3B.16 states the following.[1]

> *If yield signs are used at a crosswalk that crosses an uncontrolled multi-lane approach, the yield lines should be placed 20 to 50 feet in advance of the nearest crosswalk line, and parking should be prohibited in the area between the yield line and the crosswalk.*
>
> *If yield lines are used at a crosswalk that crosses an uncontrolled multi-lane approach, Yield Here To Pedestrians (R1-5 series) signs shall be used.*
>
> *When drivers yield or stop too close to crosswalks that cross uncontrolled multi-lane approaches, they placed pedestrians at risk by blocking other drivers' views of pedestrians and by blocking pedestrians' views of vehicles approaching in other lanes.*
>
> *Yield lines may be staggered longitudinally on a case-by-case basis.*
>
> *Staggered yield lines can improve the driver's view of pedestrians… Refer to CA MUTCD Figures 3B-13 (Drawing D) and 3B-17 for example yield line treatments.*

## TABLE 2: ENHANCED SIGNING AND STRIPING TREATMENTS

### Stop and Yield Lines at Controlled Marked Crosswalks

Stop (yield) lines may be placed in front of crosswalks where drivers are required to stop or yield in compliance with a traffic control device. Although not required per CA MUTCD Section 3B.16, they can help keep drivers from encroaching into the crosswalk.[1] The City's current standard, in most cases, is to install a 24-inch stop line seven feet in advance of marked crosswalk on a signalized approach (refer to page X). The City does not typically install a stop line at a stop-controlled location with a marked crosswalk.

### Warning Sign

High-visibility yellow or fluorescent-yellow-green (FYG) warning signs are posted to increase the visibility of a pedestrian crossing. Signs may also be placed in advance of the crosswalk to warn motorists of a crossing ahead and where unexpected entries into the roadway may occur.

W11-2 (Pedestrian Crossing) and W16-7p (downward diagonal pointing arrow) signs should be placed at all marked uncontrolled crosswalks. In addition, the City's practice is to use W11-2 warning signs in advance of uncontrolled marked crosswalks. The City's current practice is to install FYG signs primarily in school zones.

CA MUTCD Section 2C.50 states the following regarding the use of FYG signs.[1]

> *The W11-2 (Pedestrian Crossing) and related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.*
>
> *When a fluorescent yellow-green background is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a selected site area should be avoided.*

Other relevant non-vehicular warning signs that may use FYG include W11-1 (Bicycle Crossing) and W11-5 (Trail Crossing).

## TABLE 2: ENHANCED SIGNING AND STRIPING TREATMENTS

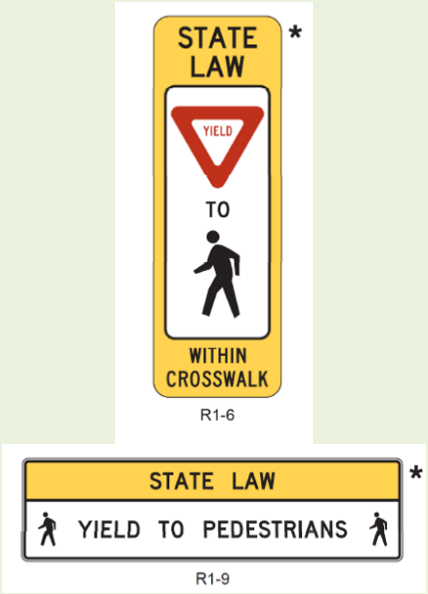


Image Source: CA MUTCD (2012)

### In-Street and Overhead Pedestrian Crossing Sign

This measure involves posting regulatory signs on lane lines, road centerlines or medians. The City's current practice is to install these signs at locations where there is a raised median.

CA MUTCD Section 2B.12 states the following.[1]

*The In-Street Pedestrian Crossing (R1-6) sign or the Overhead Pedestrian Crossing (R1-9) sign may be used to remind road users of laws regarding right-of way at an unsignalized pedestrian crosswalk.*

*If used, the In-Street Pedestrian Crossing sign shall be placed in the roadway at the crosswalk location on the center line, on a lane line, or on a median island.*

*The In-Street Pedestrian Crossing sign shall not be post-mounted on the left-hand or right-hand side of the roadway.*

*If used, the Overhead Pedestrian Crossing sign shall be placed over the roadway at the crosswalk location.*

The following motorist (yield) compliance findings are from the NCHRP 562 study: two lane street (approximately 82 – 91%); no information is available for roadways with more than two lanes.[9]

### Textured Pavement

Textured pavement can be used in crosswalks or in intersections as an aesthetic enhancement. Due to its texture and visual difference, it may increase crosswalk visibility. Textured pavement can be made of brick or, alternatively, both concrete and asphalt can be stamped to look like brick or stone.

CA MUTCD Section 3B.18 states the following.[1]

*When crosswalk lines are used, they shall consist of solid white lines that mark the crosswalk. They shall not be less than 12 inches or greater than 24 inches in width. Therefore, textured pavement does not constitute a marked crosswalk. It is advisable to install crosswalk lines and/or limit lines at these locations.*

## TABLE 3: ACTIVE WHEN PRESENT TREATMENTS

**Flashing Warning Beacon**

Flashing circular yellow signal indications can be installed overhead or post-mounted roadside either in advance of the crosswalk or at the crosswalk to increase visibility of a pedestrian crossing. Full-time flashing beacons are not recommended; flashing beacons are most effective when they are activated by the crosswalk user (they should rest on dark). By resting on dark, they can also be solar powered.

CA MUTCD Section 4L.03 states the following.[1]

> *Typical applications of Warning Beacons include supplemental emphasis to warning signs and as emphasis for midblock crosswalks.*
>
> *Warning Beacons should be operated only during those periods or times when the condition or regulation exists.*
>
> *Warning Beacons that are actuated by pedestrians, bicyclists, or other road users may be used as appropriate to provide additional warning to vehicles approaching a crossing or other location.*

The following motorist (yield) compliance findings are from the NCHRP 562 study: four lane street (approximately 29 – 73%); no information is available for roadways with two or three lanes.[9]

## TABLE 3: ACTIVE WHEN PRESENT TREATMENTS


**Pedestrian-Activated Flashing (Embedded LED) Warning Sign**

Similar to a typical warning sign, this treatment is intended to increase motorist awareness of a pedestrian in a crosswalk. The sign includes embedded Light Emitting Diodes (LED) within the sign border that illuminate when activated. The sign may be push-button activated or activated with passive detection. Embedded LED units enhance visibility and recognition of warning signs to drivers, especially under low-light or low-visibility conditions.

CA MUTCD Section 2A.08 states the following.[1]

*Light Emitting Diode (LED) units may be used in the border of a STOP or warning signs, except for Changeable Message Signs, to improve the conspicuity of signs.*

*If flashed, all LED units shall flash simultaneously at a rate of more than 50 and less than 60 times per minute.*

*The uniformity of the sign design shall be maintained without any decrease in visibility, legibility, or driver comprehension during either daytime or nighttime conditions.*

## TABLE 3: ACTIVE WHEN PRESENT TREATMENTS

Image Source: Eugene Safe Routes to School

**Rectangular Rapid Flashing Beacon (RRFB)**

The Stutter Flash (RRFB) is an enhancement to the flashing beacon that replaces the traditional slower flashing incandescent lamps with rapid flashing LED lamps. The RRFB may be push-button activated or activated with passive detection. Typical installation is roadside; however, RRFBs may also be installed in the median to further increase driver yielding behavior. This treatment is approved for use in California, but is not included in the CA MUTCD. FHWA Interim Approval was granted in 2011 (http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/interim.htm).[13]

FHWA states the following regarding RRFBs.[22]

> *RRFBs are a lower cost alternative to traffic signals and hybrid signals that are shown to increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings.*

The following motorist (yield) compliance findings are from FHWA-HRT-11-039.[23]

> *Yielding during the baseline period before the introduction of the RRFB ranged between zero and 26 percent. The introduction of the RRFB was associated with yielding that ranged between 72 and 96 percent at the 2-year follow-up.*

## TABLE 3: ACTIVE WHEN PRESENT TREATMENTS

### In-Roadway Warning Lights

In-Roadway Warning Lights are considered a special type of highway traffic signal installed directly on the roadway surface to warn road users of a situation requiring slowing or stopping, which includes uncontrolled marked crosswalks.

CA MUTCD Section 4N states the following.[1]

*If used, In-Roadway Warning Lights at crosswalks shall be installed only at marked crosswalks with applicable warning signs. They shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.*

*They shall initiate operation based on pedestrian actuation and shall cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after the pedestrian clears the crosswalk.*

*The following shall be considered when evaluating the need for In-Roadway Warning Lights:*
*- At least 40 pedestrians regularly use the crossing during each of any two hours (not necessarily consecutive) during a 24-hour period.*
*- The vehicular volume through the crossing exceeds 200 vehicles per hour in urban areas or 140 vehicles per hour in rural areas during peak-hour pedestrian usage.*
*- The critical approach speed (85th percentile) is 45 mph or less.*
*- In-Roadway Warning Lights are visible to drivers at the minimum stopping sight distance for the posted speed limit.*

## TABLE 4: RED TREATMENTS

Image Source: FHWA


Image Source: FHWA

The following before-after evaluation results are from FHWA-HRT-11-039.[23]

- *There was a 29 percent reduction in total crashes, which is statistically significant at the 95 percent confidence level.*
- *There was a 69 percent reduction in pedestrian crashes, which is statistically significant at the 95 percent confidence level.*
- *There was a 15 percent reduction in severe crashes, which is not statistically significant at the 95 percent confidence level.*

### HAWK / Pedestrian Hybrid Beacon

The HAWK (High Intensity Activated Crosswalk) or Pedestrian Hybrid Beacon is a pedestrian-activated beacon that is a combination of a beacon flasher and a traffic control signal. When actuated, the HAWK displays a yellow (warning) indication followed by a solid red light. During the pedestrian clearance interval, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the signal goes dark.

The HAWK is commonly installed as an alternative to a full pedestrian signal where pedestrian volume thresholds associated with the signal warrant are not met. This treatment is now approved for use in California. It was adopted in the 2012 CA MUTCD.

Section 4F of the CA MUTCD states the following.[1]

> *The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs.* (This guidance statement is under debate at the federal level. Most installations are at minor side street locations. The National Committee on Uniform Traffic Control Devices is pursuing formal revision to the Federal MUTCD)
>
> *Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk, or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance.*

The CA MUTCD also provides Figures 4F-1 and -2, which provide installation guidance using vehicle and pedestrian volume thresholds for different roadway speeds and crosswalk lengths.

FHWA provides the following guidance.[24]

> *Pedestrian hybrid beacons should* only be used in conjunction *with a marked crosswalk. In general, they should be used if gaps in traffic are not adequate to permit pedestrians to cross, if vehicle speeds on the major street are too high to permit pedestrians to cross, or if pedestrian delay is excessive. Transit and school locations may be good places to consider using the pedestrian hybrid beacon.*

## TABLE 4: RED TREATMENTS

### Pedestrian Signal

A pedestrian signal is a conventional traffic control device with a warrant for use based on the CA MUTCD. The pedestrian volume warrant (Warrant 4) is primarily intended for locations where pedestrian delay is excessive and pedestrian volumes are high enough to substantiate signal control. The school crossing warrant (Warrant 5) is intended for locations where the primary reason for installation is to facilitate the crossing of a major street by schoolchildren (elementary through high school).

CA MUTCD Section 4C.05 states that if the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, the figures associated with 70-percent may be used to evaluate warrant criteria.

CA MUTCD Section 4C.05 also states the following regarding Warrant 4.[(1)]

> *The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.*

CA MUTCD Section 4C.06 states the following regarding Warrant 5.[(1)]

> *The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.*