Appendix I: Bicycle Wayfinding and Data Collection Grant Application

DEPARTMENT OF COMMUNITY DEVELOPMENT & SUSTAINABILITY

23 Russell Boulevard, Suite 2 – Davis, California 95616
530/757-5610 – FAX: 530/757-5660 – TDD: 530/757-5666

August 15, 2013

Victoria S. Cacciatore
Active Transportation Project Coordinator
Sacramento Area Council of Governments
1415 L Street Suite 300
Sacramento, CA 95814

Dear Ms. Cacciatore,

The City of Davis is pleased to submit our application to SACOG requesting $217,600.00 for the *'Davis: Bicycle Pedestrian Wayfinding and Data Collection'* project under the 2014 Bicycle and Pedestrian Funding Program.

The project will provide directional signage throughout the City of Davis to guide pedestrians and bicyclists to key activity destinations, including schools, parks, shopping centers and transit stops.

Currently the City of Davis boasts fifty miles of on-street bike lanes and over fifty miles of separated, shared use paths; however, it has no bicycle-specific wayfinding signage to assist users in finding safe, low-stress, efficient bicycle routes. The City seeks to remedy this situation and attain a more robust, complete bicycle network.

The wayfinding program will benefit both bicyclists and pedestrians interested in using the City's sustainable transportation network to its fullest. Key groups that will benefit include schoolchildren and families seeking a safe route to school, UC Davis students, residents, and visitors. The effectiveness of the wayfinding program will be evaluated by utilizing automated counting technology, surveys to bicyclists and pedestrians, and analysis of bicycle crash records before and after wayfinding installation.

We thank the Committee for its consideration of this project and we are available to answer any questions. Please contact Dave "DK" Kemp, Active Transportation Coordinator at 530-757-5669 or dkemp@cityofdavis.org.

Sincerely,

Mike Webb
Community Development &
Sustainability Director

8/15/13
Date

K. Project Application

The below information should serve as a summary of the proposed project.

Project Title	Davis: Bicycle and Pedestrian Wayfinding & Data Collection Program
SACOG ID number (if available) (Bike/Ped/Trails Master Plan, MTP, MTIP/SACTrak)	
PPNO and/or EA number (if applicable) **Federal ID number** (if applicable)	
Responsible Project Manager/Contact Name, Position: Role: Address: Phone: E-mail:	Dave "DK" Kemp, Active Transportation Coordinator 23 Russell Blvd, Suite 2, Davis, CA 95616 (530) 757-5669 DKemp@cityofdavis.org
Co-sponsor/Partner Agencies (if applicable)	

Project Location (Also attach a map)	Davis, CA – Citywide. Primary bikeway and pedestrian network, which consists of streets with bike lanes, share use paths, and low traffic streets.
Project Scope/ Description (250 word limit)	The proposed project comprises two primary components: • **Bicycle & Pedestrian Wayfinding** • **Data Collection Program** 1. Installation of a bicycle and pedestrian wayfinding system to provide guidance to key destinations, such as, schools, parks, shopping centers, transit stops, UC Davis, major areas of Davis, and other public facilities. Includes the following items: • 350 Directional Signs (decision, confirmation, and turn signs) • 390 thermoplastic road markings (330 neighborhood directional bikeway markings and 60 shared lane markings) The pedestrian wayfinding component is focused along 15 miles of shared use path. The bicycle wayfinding component is focused along 13 miles of low-stress residential streets, 26 miles of streets with bike lanes (arterials and collectors), and 15 miles of shared use paths. 2. Installation of 120 safety and etiquette signs for bicyclists and pedestrians to be installed on shared use paths. Includes the following directives: • Bicycle Slow Zone (Begin and End) • Use an Audible Signal Before Passing on the Left. • Keep Right Except to Pass 3. Installation of 250 Davis Bike Loop thermoplastic markings to replace painted stencil. 4. Installation of permanent and temporary automated bicycle & pedestrian counters at strategic locations.

What planning documents or other sources describe the need for your project?	1. City of Davis – 2009 Bicycle Plan 2. City of Davis – 2013 Work Plan of the Bicycle Advisory Commission
Summarize the need for the project based on these documents.	1. The need for bicycle wayfinding is based on a goal in the 2009 City of Davis Bicycle Plan: *"Provide complete, safe, and attractive accessibility for bicyclists through implementing a city-wide wayfinding program."* 2. The City of Davis - Bicycle Advisory Commission adopted 2013 Work Plan specifically identifies the implementation of a bicycle wayfinding system: *"Wayfinding for cyclists would assist residents, students, and visitors in navigating their way around the City of Davis. Wayfinding systems can help bicyclists reach their destinations in a more time efficient and safe route. Wayfinding that incorporates safe routes to schools would assist in achieving Goal 1 above, and remains consistent with the 2011 Work Plan goals of the BAC.* *Action: Create uniform standards and implement a bicycling wayfinding system that includes well-placed, easy-to-read signs for important routes and destinations."*
Describe the project area's current transportation facilities, by mode.	Davis bikeways are comprised of 56 miles of bike lanes and 50 miles of shared-use paths. These bicycle facilities provide the integrated network for bicyclists and pedestrians (paths) to reach various destinations, including schools, parks, shopping centers, transit, and city facilities.
Once your project is built, how will users benefit from your project?	Currently, directional signage to key destinations is minimal and geared toward motor vehicles. There is a lack of wayfinding within much of the bicycle and pedestrian network. Bicyclists and pedestrians will be presented clear signage to key destinations throughout the city. Bicycle wayfinding provides clear and direct

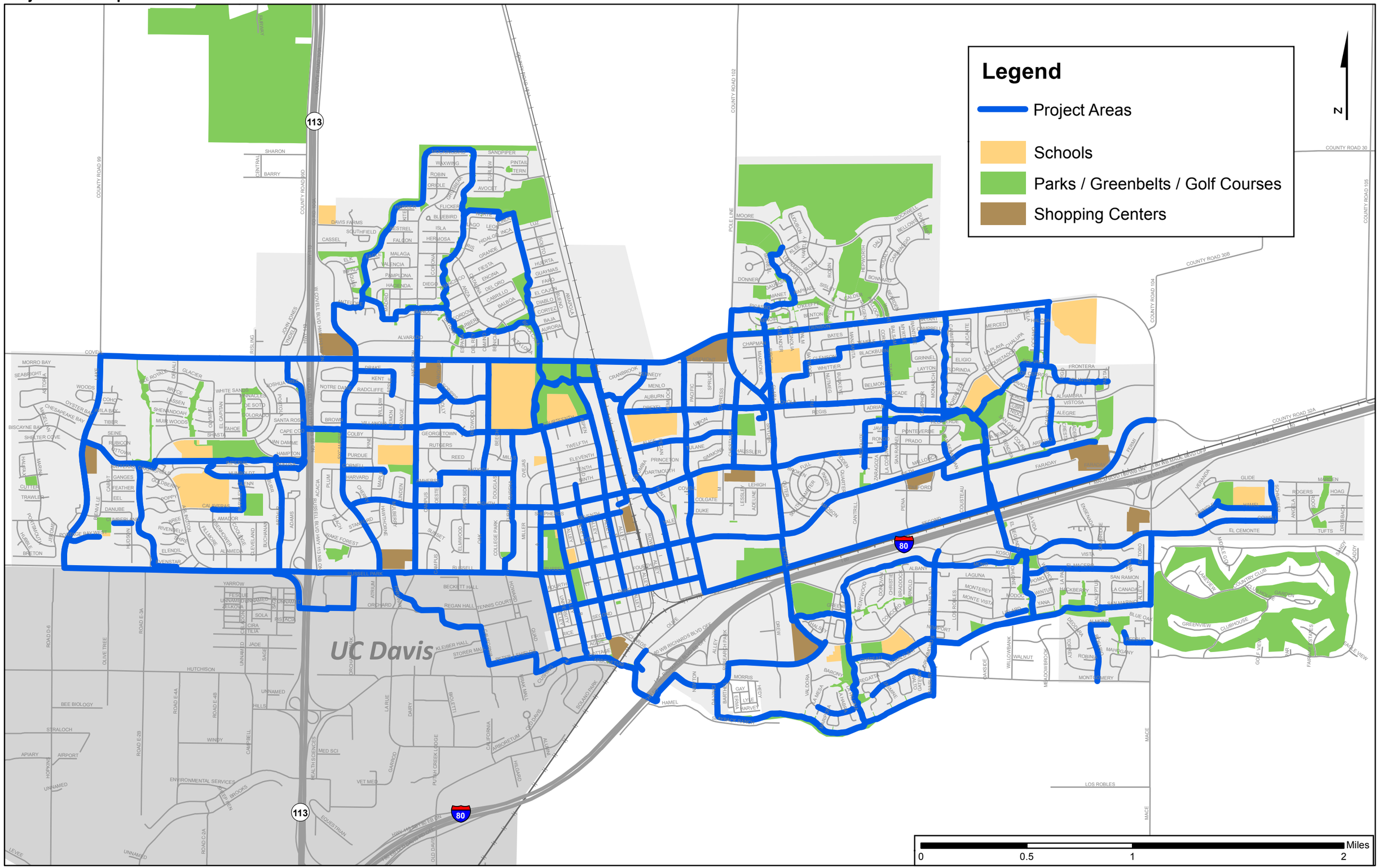
	education and information to all levels of bicycle users. It clarifies the complexities of the bikeway network, especially to new riders in Davis. A large portion of the population will continue to be new riders in Davis due to the ongoing influx of incoming students to UC Davis. Continuing conflicts between bicyclists and pedestrians are occurring on shared use paths. Many users are not educated in the proper way to share the space, including using an audible warning before passing on the left, keeping right except to pass, and slowing down in high traffic areas. Signage to directly educate the proper etiquette on the shared-use paths will provide clear direction to all users and mitigate conflicts. The Davis Bike Loop provides a key identified route consisting of mostly off street or low traffic street bikeways corridors. It serves as a major bicycle transportation route for students to various schools, as well as numerous destinations throughout the city. Clearly identifying the bike loop with thermoplastic pavement markings will allow for the route to remain clear to all new and existing users while minimizing maintenance cost with yearly repainting operations. Bicycle counters at strategic locations allow more complete evaluation of the overall bicycle network. It also provides an opportunity to document bicycle metrics before and after an infrastructure improvements.
Project Schedule (estimated month and year): 1. Start environmental/preliminary engineering 2. Final ED approved - Start engineering/design 3. Start R/W acquisition & utilities 4. Complete plans, R/W, & permits – Ready to advertise for construction/procurement	1. January 2014 2. May 2014 3. July 2014 4. September 2014
Total Project Cost (Part L)	$217,600
Total Funding Request	$192,000

Funding committed from other sources 1. Environmental/preliminary engineering 2. Engineering/design 3. R/W acquisition & utilities 4. Construction/procurement TOTAL Describe any other potential funding sources	1. In-kind 2. $10,600 3. Not Applicable 4. $15,000 Total $25,600 (11.74%)
Can you build a usable partial stage of this project? If so, please describe the phases and costs.	A pilot project for directional signage and markings will be implemented as part of the funded Drexel Bike Boulevard. An evaluation of the signage design, placement, and effectiveness can be determined before city-wide implementation. City-wide implementation can be phased in, with highest priority along the most important bicycle corridors. However, due to the varied locations of the key destinations throughout the city, it would be best to implement the system all at one time in order to provide complete directional guidance.
Have you identified any significant and reasonably likely risks to the project? Describe: (150 words maximum total) ▪ Risks that would change scope ▪ Risks that would change schedule ▪ Risks that would change cost	Scope: None foreseen at this point. Schedule: None foreseen at this point. Cost: Risks that would change costs include the number of signs, number of new poles needed versus existing poles that can be used.
Project Study Report or equivalent completion date (if PSR completed, attach electronic file to CD of application packet)	Not Applicable
Does project include quantitative project evaluation? If yes, please describe (250 word maximum)	Utilizing automated counting technology, conduct before and after data collection at strategic segments of the bike and pedestrian network to determine if the installation of a wayfinding system has affected bicycle and pedestrian traffic.

Does this project have any prior Regional Funding from SACOG? If so, please describe history of regional funding and reason for additional funding request.	No prior regional funding has been provided by SACOG for this project.
Environmental Justice: Please discuss the key benefits or burdens of this project for any low income and/or minority members of the community, and include a brief response to the following (150 word limit): <u>Pre-Construction Phase Projects:</u> What kind of outreach to the community, low-income and/or minority residents of the project area, and/or to other stakeholders do you plan to undertake? <u>Construction Projects:</u> What kind of outreach have you conducted with community, low-income or minority residents of the project area, or other stakeholders in the process of planning this project?	The City of Davis seeks to include low-income and minority members of the community in all stakeholder outreach, particularly in bicycle and pedestrian projects, since those groups are more likely to be dependent on non-automobile modes for transportation. As such, this project particularly benefits those groups, by creating a viable, safe, and convenient major bicycle transportation corridor and safer pedestrian environment.
TAP Eligible Projects: Will you be working with a community conservation corps or the California Conservation Corps (yes/no)? Please explain (50 word limit).	The City has not previously used the CCC, but it open to learning more about the process, and would be open to using them on this project, if applicable.

Project Area Map

Davis Bicycle Wayfinding and Data Collection



Basic Tool: Cost and Schedule Summary

For use with 2013 Funding Round Community Design & Bike/Ped applicants only

Fill in **BLUE SECTIONS** where appropriate. Edit the formula cells at your own risk.

Project Sponsor

City of Davis

Project Title

Bicycle Pedestrian Wayfinding & Data Collection Project

Project Description (scope and limits)

Directional signage and markings, shared use path safety etiquette signs, Davis Bike Loop thermoplastic markings, and automated bicycle & pedestria counters.

SUMMARY	Start	End	Costs	Requests	Applicant Comment Summary
Non-capital Activities	Jan-13	Aug-13	$ -	$ -	
Environmental & Design	Jan-14	Jan-14	$ 25,600	$ -	
Right-of-Way	Jan-14	Jan-14	$ -	$ -	
Construction	Jan-14	Jan-14	$ 192,000	$ 192,000	
TOTAL	**Jan-13**	**Jan-14**	**$ 217,600**	**$ 192,000**	
				88.24%	

TASKS	Begin	End	Cost Estimate	Requested Funding	Applicant Comments
NON-CAPITAL ACTIVITIES					
Authorization to Proceed	NA		NA	NA	
Planning Studies	Jan-13	Aug-13			Planning, outreach, and design
Non-capital staff activities	Jan-13	Aug-13			concepts complete, in-kind
Non-capital materials	Jan-13	Aug-13			
Miscellaneous	Jan-13	Aug-13			
Totals	Jan-13	Aug-13	$ -	$ -	
ENVIRONMENTAL & DESIGN					
Authorization to Proceed	Jan-14				
	NEPA	CEQA			
Environmental Document Type					
Environmental Decision Type	FONSI	Neg Dec			Signing/marking projects and data collection
For more information, visit the Caltrans Standard Environmental Reference webpage					instruments are not applicable to
Environmental Clearance	Jan-14	Jan-14			Environmental & Design
Final Design (Plans, Specs, & Est)					
Totals	Jan-14	Jan-14			
RIGHT-OF-WAY					
Authorization to Proceed	14-Jan	14-Jan			
Need ROW Acquisition?	14-Jan				Signing/marking projects and data collection
Need Utilities Relocation?	14-Jan				instruments are within exisiting Right of Way
Totals	Jan-14	Jan-14			
CONSTRUCTION					
Authorization to Proceed	Jan-14	Jan-14			Anticipate August 2014 construction start
Totals	Jan-14	Jan-14			

M. ENGINEER'S ESTIMATE

BICYCLE WAYFINDING AND DATA COLLECTION
CITY OF DAVIS

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT $
1	Street Confirmation/Turn/Decision Sign (24" x 36")	EA	250	$64.50	$16,125
2	Metal Pole (2" Diameter Round/2" Square x 11.5')	EA	100	$46.00	$4,600
3	Installation (Street Confirmation/Turn/Destination)	EA	250	$25.00	$6,250
4	Path Confirmation/Turn/Decision Sign (12" x 18")	EA	100	$16.00	$1,600
5	Wooden Post (6" x 6" x 6')	EA	100	$21.00	$2,100
6	Installation (Path Confirmation/Turn/Destination)	EA	100	$40.00	$4,000
7	Path Over/Under-Crossing Location Sign (6" x 24")	EA	52	$10.75	$559
8	Installation (Path Over/Under-Crossing Location)	EA	52	$25.00	$1,300
9	Neighborhood Bikeway Guide Marking (2' Diameter round, arrow)	EA	330	$55.00	$18,150
10	Shared Lane Marking (Thermoplastic)	EA	60	$350.00	$21,000
11	Installation (Guide/Shared Lane Pavement Marking)	EA	390	$35.00	$13,650
12	Davis Bike Loop Marking (2' Diameter Round, Thermoplastic)	EA	250	$55.00	$13,750
13	Installation (Bike Loop Pavement Marking)	EA	250	$35.00	$8,750
14	Wooden Post (6" x 6" x 6')	EA	120	$21.00	$2,520
15	Shared-Use Path Etiquette Sign (18" x 18")	EA	120	$23.72	$2,846
16	Installation (Etiquette Sign)	EA	120	$40.00	$4,800
17	Eco-Totem Counter (2 sided, backlit)	EA	1	$25,000.00	$25,000
18	Installation (Eco-Totem)	EA	1	$2,500.00	$2,500
19	Eco-Multi Counter	EA	6	$4,550.00	$27,300
20	Installation (Eco-Multi)	EA	6	$1,000.00	$6,000
21	Zelt Counter	EA	2	$3,600.00	$7,200
22	Installation (Zelt)	EA	2	$500.00	$1,000
23	Pneumatic Tube Counter	EA	2	$2,500.00	$5,000
	SUBTOTAL				**196,000**
	Contingency (10%)				$19,600
	Municipal Arts Fund				$2,000
	Construction Management/Contract Administration				$0
	TOTAL PROJECT COST				**$217,600**
	Total Participating Costs				
	Maximum Federal Funds (88.53%)				
	Total Funding Request	88.53%			$192,641
	Total Local Match	11.47%			$24,959

Please circle current status of project: Feasibility Study, PSR, Environmental, 30% Design, 60% Design, 90% Design, 100% Design

N. Bicycle and Pedestrian Program Specific Questions

1. Project Screening Conditions
    a. Project is included in the Master Plan as a planned project. **Yes.**

    b. Project is ready for inclusion into the *Metropolitan Transportation Improvement Program*, with project scope and cost. **Yes**

    c. Project is eligible for appropriate funding sources (i.e. CMAQ, RSTP, STIP, and TAP). **Yes**

    d. Project meets the minimum project size of $167,205 ($150,000 funding award + $17,205 local match). **Yes**

2. Project Funding Priorities and Goals

    Capital Project Priorities

    a. Increased access to transit services. Will the proposed project increase bicycle and pedestrian access to transit stops and transfer center?

    The bicycle wayfinding project will increase guidance for bicyclists and pedestrians to transit. Key transit centers, including Amtrak, Yolo Bus, and Unitrans will be included on destination signage.

    b. Increased access to schools. Will the proposed project increase bicycle and pedestrian access to schools?

    The bicycle wayfinding project will increase guidance for bicyclists and pedestrians to schools. All of the public schools will be included within destinations signage. Wayfinding will be presented along routes that are determined from previous Safe Routes to School Walk/Bike Audit Project.

    c. *Eliminated gaps in the existing bicycle/pedestrian network*. Will the proposed project help form complete bicycle and pedestrian networks, enabling bicyclists and pedestrians to travel on a continuous network?

    The bicycle wayfinding project helps to complete the bikeway network by providing suggested, low-stress, efficient bicycle routes throughout the city that lead to various activity centers.

d. *Removed physical barriers in the bicycle and pedestrian network*. Will the proposed project remove physical barriers, using grade-separated crossings when appropriate, to complete the bicycle and pedestrian network and enable through travel by bicyclists and pedestrians?

The bicycle wayfinding project does not remove physical barriers; rather, the wayfinding project guides cyclists to appropriate facilities that safely and efficiently cross major barriers, such as railroad tracks, arterials, and major highways.

e. *Facility completion*. Will the project "complete" a street or corridor by adding bicycle and pedestrian facilities (e.g., pathways, lanes, shoulders, crossings, and sidewalks) in areas with high existing or potential transportation use?

The City of Davis boasts fifty miles of on-street bike lanes and over fifty miles of separated, shared use paths; however, a critical and missing component is the addition of wayfinding signage for cyclists and pedestrians. This is the final component in creating a complete bikeway network. The bicycle wayfinding project completes all streets in Davis in terms of providing directional information for cyclists to numerous wayfinding destinations, such as schools, parks, and shopping centers.

f. *Reduce Vehicles Miles Traveled*.

Wayfinding on its own cannot be expected to create modal shift, but it contributes to increases in trip length and journey types undertaken by bicycling and walking as a result of increased awareness of opportunity following the pre-contemplation, contemplation and preparation stages. In other words, a bike route without signs cannot possibly attract use and a bike network that does not provide information about how to get to places using it cannot be easily used for journeys.

The bicycle wayfinding project will help guide new bicyclists to key destinations throughout the city on new routes based on the primary bikeway network. A large percentage of the city's population are new bicyclists to Davis due to the major influx of incoming students to UC Davis. This project simplifies and ties together the bikeway network to make cycling an easy choice for 'would be' cyclists who might otherwise choose to drive a motor vehicle.

3. Project Need and Analysis of Community Benefits

Directional signs and markings along shared use paths and local streets will provide information to cyclists and pedestrians regarding destinations, such as, shopping centers, schools, parks, UC Davis, and other public services. Shared use paths, initially constructed for recreational purposes, can be

re-purposed to also serve transportation needs by incorporating wayfinding guidance for cyclists and pedestrians at junctions along the shared use path network.

Wayfinding is highly needed to direct youth cyclists to schools and parks along low-stress, neighborhood bikeways that connect to schools and parks throughout the city. This project integrates the Safe Routes to School - Walk and Bike Audit project that was conducted in the spring of 2013. Deliverables from the audit project include school-specific bicycling and walking maps that offer suggested, low-stress routes to schools. This project will complement the Safe Routes to School maps by providing on-street and shared use path directional signage and markings.

Wayfinding is also needed for other types of users, including UC Davis students and visitors. Each year, over 5000 UC Davis students move to Davis. Wayfinding will help UC Davis students navigate safely and efficiently along suggested bicycle routes to activity centers throughout Davis. And, as the City of Davis develops and implements tourism destination strategies, wayfinding will play a vital role in promoting sustainable tourism by promoting bicycle and pedestrian transportation.

Improved safety between bicyclists and pedestrians along shared use paths is needed. There is currently no information along the paths that show bicyclists and pedestrians how to safely cooperate. Three key areas of needed safety improvements have been identified:

- For Bicyclists – *Use and Audible Signal Before Passing on the Left* – Many pedestrians and slower bicyclists are often discouraged from using shared use paths due to the concern of being struck by a faster moving bicyclist. Advance notification of passing bicyclists helps pedestrians and slower moving bicyclists feel comfortable while allowing an opportunity to prepare themselves without being startled.
- For Bicyclists and Pedestrians – *Keep Right Except to Pass* - The City of Davis' Bicycle Advisory Committee has recommended that slower moving traffic keep to the right side of the trail and faster moving traffic pass on the left.
- For Bicyclists – *Bicycle Slow Zones* – Sections of shared use paths that have limited sight distance and are adjacent to schools and areas that experience a high concentration of pedestrians will be classified as "bicycle slow zones" in order to improve safety at strategic locations.

Bicycle and pedestrian data collection is an immediate and critical need for the City of Davis. Acquiring 24+ hour continuous data will help the City of Davis more accurately understand and plan for new bicycle and pedestrian facilities (Please see Section 5 for more background on automated counters).

4. Project Design and Readiness

The City of Davis vetted wayfinding destinations, types of signs/markings, and designs with the City of Davis' Bicycle Advisory Committee. The color choice of the bicycle wayfinding sign design was

chosen to reflect a trend of other wayfinding systems found within the cities of Berkeley, Palo Alto, and San Mateo. These cities have either implemented, or, are on the verge of implementing a bicycle wayfinding system that incorporates the color purple. Purple is also the signature color of the League of American Bicyclists' Bicycle Friendly Community Program. This color choice also sets wayfinding for cyclists apart from the typical, green directional signage designed for motor vehicle traffic. The sign design includes the silhouettes of different types of riders including commuters (work and school), and families. This design presents a personalized and custom to Davis feel that is designed to attract cyclists. Further, the design process produced a friendly, recognizable brand to represent the Davis Bikeways network.

5. Project Evaluation

The proposed wayfinding system will be evaluated with a three pronged approach:

- Utilizing automated counting technology, conduct before and after data collection at strategic segments of the bike and pedestrian network to determine if the installation of a wayfinding system has affected bicycle and pedestrian traffic.

- Administer before and after surveys to bicyclists and pedestrians to gauge how wayfinding has affected survey participant's trip choice, trip length, and knowledge of bike and pedestrian network.

- Analysis of bicycle crash records, before and after wayfinding installation.

The acquisition of automated counters presents additional evaluation benefits that will shape the future of roadway design and bicycle and pedestrian safety:

- Reveals trends in bicycle and pedestrian travel,

- Bicycle and pedestrian volumes serve a valuable role in assessing roadway risk; for example, the number of pedestrian or bicycle crashes per pedestrian or bicycle present is far more valuable than simply the number of pedestrian or bicycle crashes;

- Long-term (24+ hours) volume profiles can demonstrate whether activity on a given facility is primarily utilitarian, recreational, or a combination of the two;

- a widespread view of where and when people are walking or bicycling will help the City of Davis prioritize outreach efforts to encourage more of these activities, or to highlight problems in the network that are discouraging pedestrians or bicyclists;

- A before and after studies of infrastructure improvements will guide the design of other future roadway projects and will assist the City of Davis in determining the effectiveness and

attractiveness of facilities, such as buffered bike lanes, cycle tracks, bike boxes, and on-street bike parking facilities.

The City of Davis is currently participating in project *07-19 - Methods and Technologies for Collecting Pedestrian and Bicycle Volume Data* with the National Cooperative Highway Research Program (NCHRP) and the University of California at Berkeley to test a variety of bicycle counting technologies. Consequently, the City of Davis has experimented with several new types of counting technologies at two test sites in Davis. Our participation in the project led to discoveries regarding proper installation techniques and useful nuances that ensure optimal counting performance.

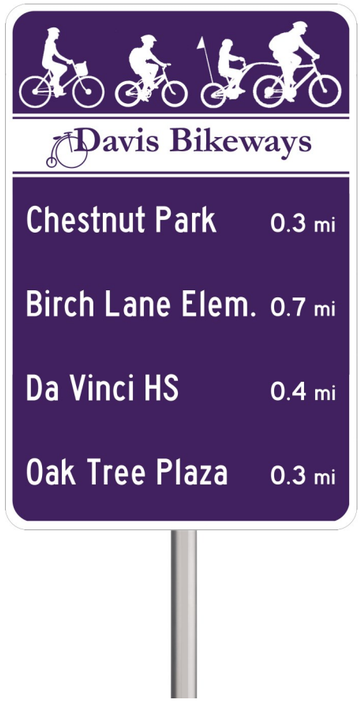
Participation in this project spurred an agreement with PhD student, Frank Proulx, from UC Berkeley's Safe Transportation Research & Education Center (SafeTREC) to develop a bicycle and pedestrian data collection program for the City of Davis. Bicycle Counting technology and data collection program methods and results that are developed by the City of Davis and UC Berkeley will be made available to the SACOG and other partner agencies. The City of Davis hopes its experience with conducting a data collection program will serve as a pilot program, or at least, provide a valuable resource for SACOG in developing its proposed program to collect bicycle and pedestrian data at other locations within the SACOG region.

6. Other Selection Considerations

Per the MTP/SCS performance goals and the land use vision for the area, wayfinding meets the bicycle infrastructure indicator by increasing the miles of signed bike routes in Davis. The wayfinding project will create thirteen miles of new, signed neighborhood bikeways. The project also increases safety for bicyclists by concentrating bicycle traffic along specific, marked bicycle corridors. This concentration of bicyclists on marked facilities leads to the Safety in Numbers affect as identified by Dr. Peter Jacobsen[1]. A reduction in bicycle crashes will occur by encouraging cyclists to travel signed routes. Signed routes will provide an increased awareness to motor vehicles to expect bicycles on the corridors. Wayfinding also meets the SCS Land Use Measures by directing cyclists and pedestrians to transit stations while also contributing to urban design by identifying key routes for bicyclists to travel throughout the city.

Wayfinding contributes to the branding and the visibility of cycling infrastructure and addresses the perception that there is a lack of cycling infrastructure even in areas where there are already safe, accessible cycling routes and supporting facilities. Bicycle wayfinding is a facility wayfinding is a key element in creating a robust and complete bicycle network.

[1] Jacobsen, P. 2003. Safety in numbers: more walkers and bicyclists, safer walking and bicycling. *Injury Prevention* 9:3, 205-209.



Directional—Confirmation Sign

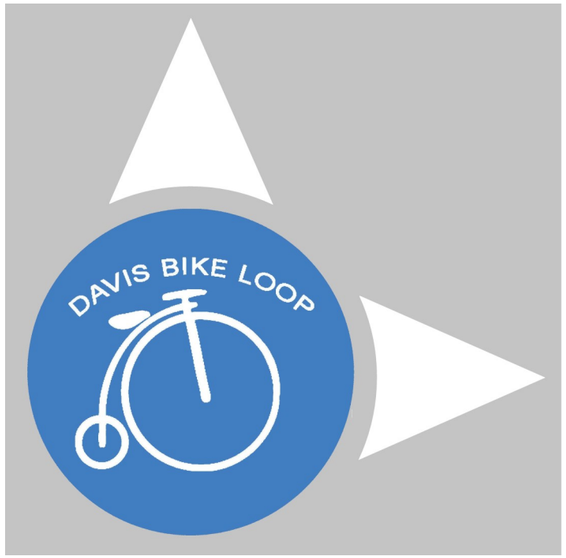
Directional—Decision Sign

Directional—Path Under/Over Crossing Street Location Sign

Directional—Turn Sign

Directional—Path Decision Sign

Neighborhood Bikeway Pavement Marking



Davis Bike Loop Pavement Marking

Path Etiquette Sign Keep Right

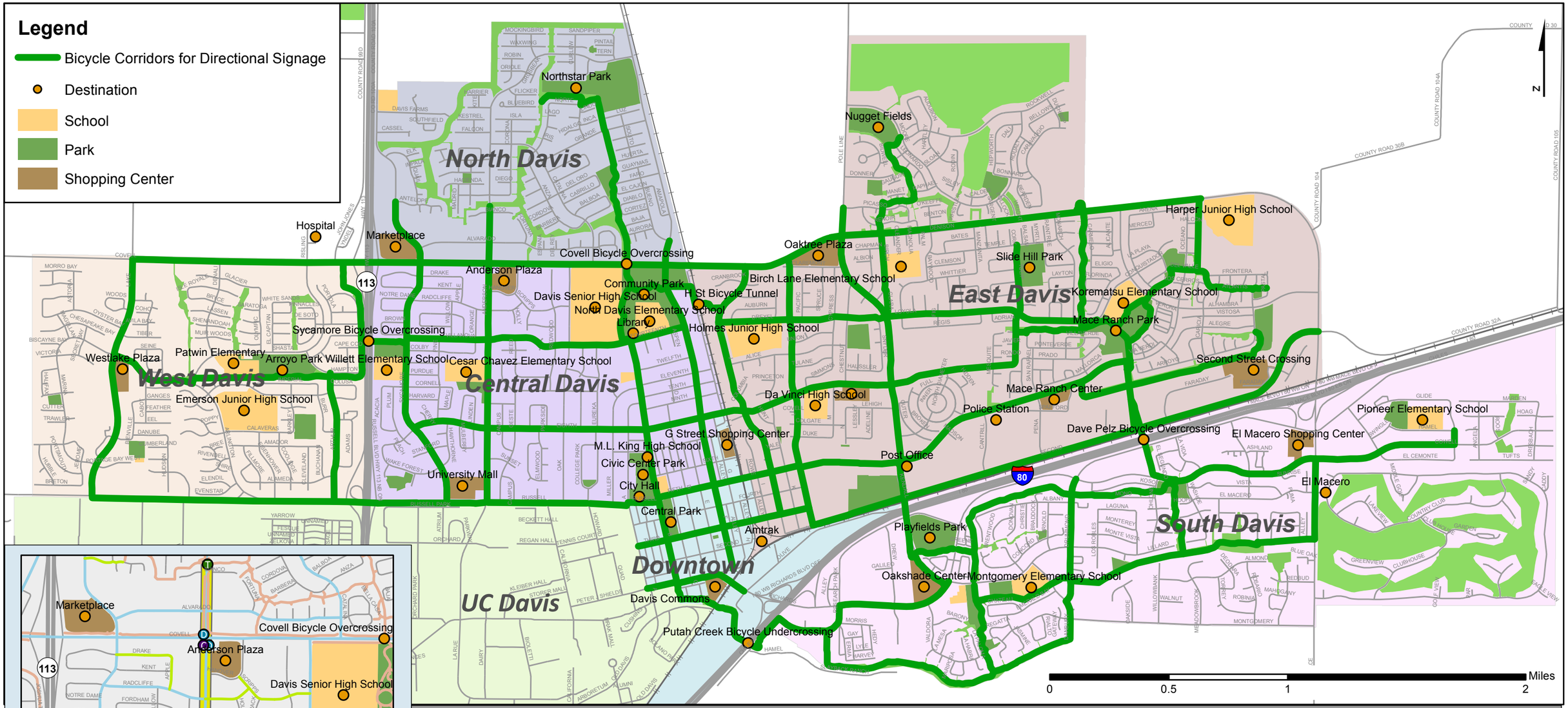
Path Etiquette Sign Use Audible Signal

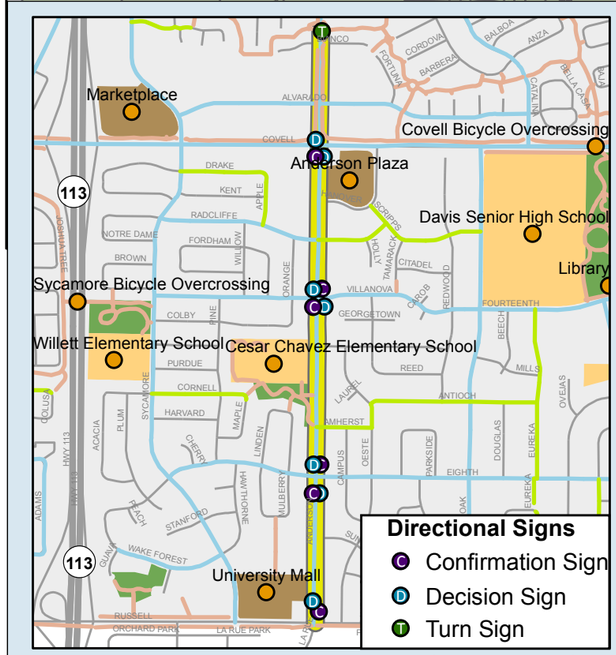
Path Etiquette Sign Bicycle Slow Zone

Eco-Multi Counter (Inductive Loop and Infrared Sensor)

Eco-Totem Counter (Inductive Loop and Display)

Directional Signage Corridors and Destinations



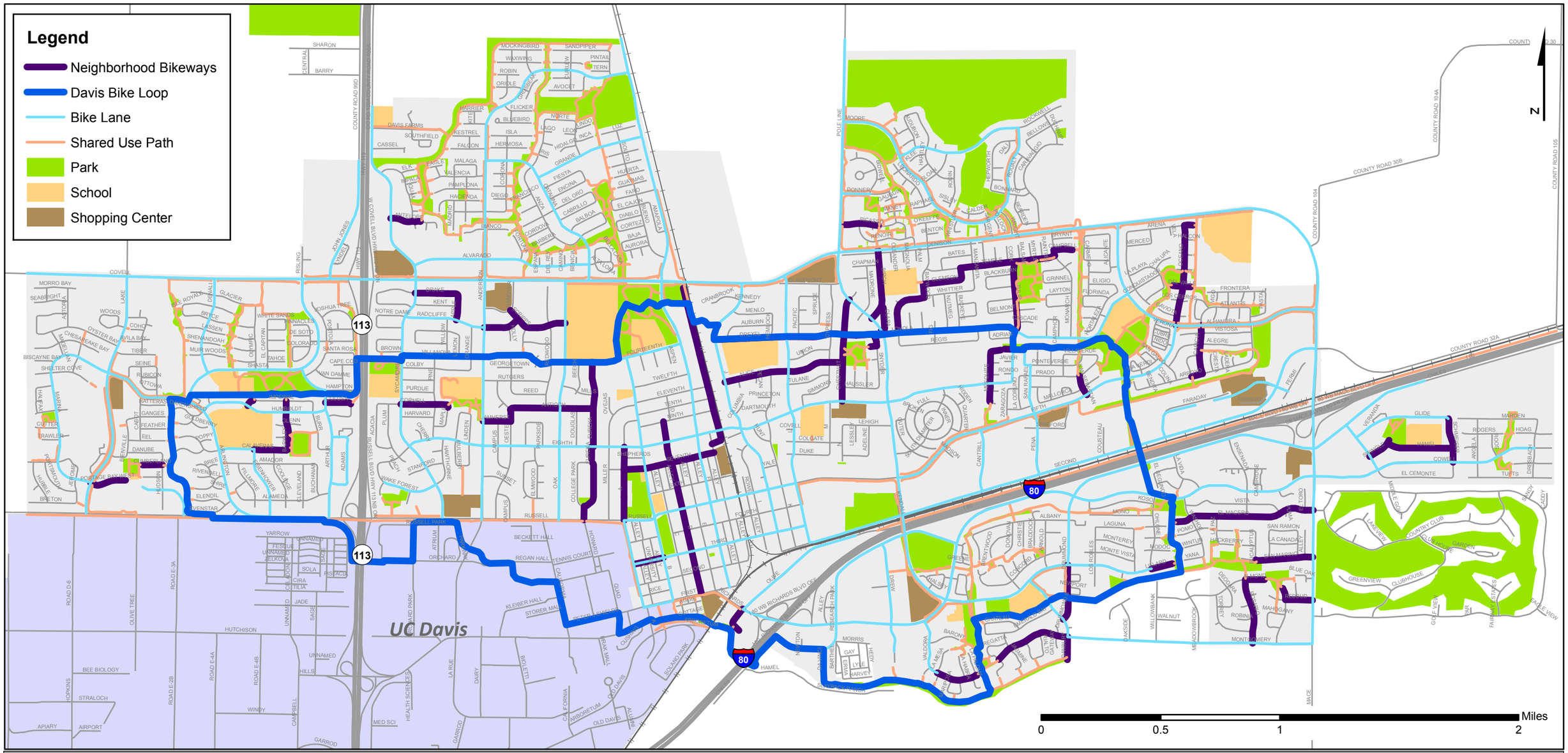


Sign Location Placement Example (Anderson Rd)

ID	Corridor	Area
1	8th St	Central
2	Anderson Rd	Central
3	Sycamore Ln	Central
4	Villanova Ave / 14th St	Central
5	B St / Community Park	Central/Downtown
6	F St	Central/Downtown
7	Russell / 5th	Central/Downtown
8	1st St / Richards Blvd	Downtown
9	3rd St	Downtown
10	A St	Downtown
11	5th St	East
12	Birch Ln / Green Meadows / Wildhorse	East
13	Covell Blvd (East Davis)	East
14	Dave Pelz O/C	East

ID	Corridor	Area
15	E 8th St / Tulip Ln	East
16	East Davis Channel	East
17	H St / Drexel Dr/ Loyola Ave	East
18	J St	East
19	L St	East
20	Mace Ranch Park / Covell Blvd	East
21	Mace Ranch / La Playa Park	East
22	Pole Line Rd	East
23	2nd St	East
24	Covell Blvd (North Davis)	North
25	Covell Park / Northstar Park	North
26	North Davis	North
27	Demonstration Path	South
28	Downtown / South Davis	South

ID	Corridor	Area
29	Drummond Ave	South
30	Mace Blvd	South
31	Putah Creek Path	South
32	South Davis	South
33	Walnut Park	South
34	Willow Creek	South
35	Arlington / Arroyo Park / Sycamore	West
36	Arthur	West
37	Covell (West Davis)	West
38	Humboldt / Colusa	West
39	Lake	West
40	Russell	West



Neighborhood Bikeways

A ST	ARROYO AVE	CLARA LANE	DANBURY ST	GEORGIA PL	MONTGOMERY AVE	REDBUD DR	SWEET BRIAR DR
ALICE ST	BARKLEY ST	CLEMSON DR	DEL VALLE PL	H ST	OCEANO WAY	ROSARIO ST	SWINGLE DR
ALMOND LN	BAYWOOD LN	COLLEGE PARK	DRAKE DR	HAMEL ST	OESTE DR	SAN MARINO DR	TEMPLE DR
AMHERST DR	BIRCH LN	COLUSA AVE	DREXEL DR	HOOPA PL	OLIVE DR	SAN SEBASTIAN ST	THIRD ST
ANTELOPE AVE	CALAVERAS AVE	CORNELL DR	DRUMMOND AVE	IMPERIAL AVE	PICASSO AVE	SCHMEISER AVE	TULIP LN
ANTIOCH DR	CAMPBELL PL	COTTONWOOD CT	DRUMMOND S	LILLARD DR	PONTEVERDE LN	SCRIPPS DR	VALDORA ST
APPLE LN	CARICIA DR	CUMBERLAND PL	EL MACERO DR	MESQUITE DR	PORTAGE BAY WEST	SEVENTH ST	WELLESLEY PL
ARENA DR	CHESTNUT LN	D ST	EUREKA AVE	MONARCH LN	RADCLIFFE DR	SNYDER DR	WEST EIGHTH ST
							WHITTIER DR

Bicycle Counter Locations

Davis Bicycle Wayfinding and Data Collection

Locations of Permanent Bicycle Counters	Counter Type
3rd St East of B St EB Bike Lane	Eco Totem
Covell Blvd Bicycle Overcrossing next to Community Park	Eco Multi
Dave Pelz Bicycle Overcrossing over I-80	Eco Multi
H Street Bicycle Tunnel	Eco Multi
Putah Creek Bicycle Undercrossing under I-80	Eco Multi
Russell Blvd Shared Use Path near Arthur St	Eco Multi

Bicycle Counter Locations

- Eco Multi Permanent Counter
- Eco Totem Permanent Counter
- Existing Counter

O. Emissions Benefit Calculations for CMAQ Funding

SACOG 2014 Bicycle Pedestrian Program Funding

Determining the air quality benefit of this project begins with two sources of data: Journey to Work data from the American Community Survey and bike to school data which is derived from bike rack counts that are conducted in schools K-12 in the Davis Joint Unified School District (DJUSD).

Davis currently experiences approximately 30,000 total daily trips to work. Of those trips, 6000 trips are made by bicycle, or 20% of the mode share for commute trips to work.

DJUSD has a student enrollment of 8,600 students. On average, among all the schools in the district, approximately 2150 students bike to school on a daily basis, or 25% of the total mode share for trips to school. Therefore, Davis currently experiences 8150 bicycle trips to work and school on a daily basis.

The City of Davis' five year goal is to increase **bike to work trips** from 20% to 30% of total trips and **bike to school trips** from 25% to 35% of total trips. This 10% increase cannot be achieved through wayfinding alone; however, it is assumed that the wayfinding will contribute to a 5% increase of bike to work and bike to school trips respectively.

- There are 30,000 total trips to work per day and 8,600 total trips to school per day.
- A 5% increase in work mode share percentage for bicycles = 1500 new bicycle trips per day. With 260 work days per year, this results in 390,000 new bicycle trips per year.
- A 5% increase in school mode share percentage for bicycles = 430 new bicycle trips per day. With 180 school days per year, this results in 77,400 new bicycle trips per year.
- The total equates to 467,400 new bicycle trips per year.
- Assume 70% of these new bicycle trips will replace motor vehicle trips = **327,180 fewer motor vehicle trips per year.**

Calculations:

ROG: [(327,180) (0.462) + (588,924) (0.119)] / 454 = 487 (pounds per year)

NOx: [(327,180) (0.160) + (588,924) (0.130)] / 454 = 284 (pounds per year)

PM10: [(327,180) (0.004) + (588,924) (0.087)] / 454 = 116 (pounds per year)

ALL PROJECT TYPES (GENERIC FORM)

County:

Federal Number:

Approval Date:

Caltrans DIST-EA:

Short Description: Bicycle Pedestrian Wayfinding and Data Collection Project

Project Scope: Installation of a bicycle and pedestrian wayfinding system to provide guidance to key destinations, such as, schools, parks, shopping centers, transit stops, UC Davis, major areas of Davis, and other public facilities.

Project Sponsor: City of Davis **Private Agency:** No

CMAQ Funding: $120,200

Local Match: $16,000

Project Analysis Period: 20 **years**

Capital Recovery Factor: 0.07

EMISSION REDUCTIONS:

	Pounds per Year	Kilograms per Day
ROG:	487	1
NOx:	284	0
PM10:	116	0
Total:	***887***	***1***

COST-EFFECTIVENESS OF:

CMAQ Funds:	$9.11	**per pound**	$18,217	**per ton**
All Funding Sources:	$10.32	**per pound**	$20,642	**per ton**