1111 Broadway, Suite 800, Oakland, CA 94607 • 510.208.7400 • www.AlamedaCTC.org

Bicycle and Pedestrian Advisory Committee Meeting Agenda
Thursday, May 27, 2021 5:30 p.m.

Due to the statewide stay at home order and the Alameda County Shelter in Place Order, and pursuant to the Executive Order issued by Governor Gavin Newsom (Executive Order N-29-20), the Bicycle and Pedestrian Advisory Committee will not be convening at its Committee Room but will instead move to a remote meeting.

Members of the public wishing to submit a public comment may do so by emailing Angie Ayers at aayers@alamedactc.org by 5:00 p.m. the day before the scheduled meeting. Submitted comments will be read aloud to the Committee and those listening telephonically or electronically; if the comments are more than three minutes in length the comments will be summarized. Members of the public may also make comments during the meeting by using Zoom's "Raise Hand" feature on their phone, tablet or other device during the relevant agenda item, and waiting to be recognized by the Chair. If calling into the meeting from a telephone, you can use "Star (*) 9" to raise/ lower your hand. Comments will generally be limited to three minutes in length.

Chair:	Matt Turner	Staff Liaison:	Cathleen Sullivan, Chris G. Marks
Vice Chair:	Kristi Marleau	Clerk:	Angie Ayers

Location Information:

Virtual Meeting Information: https://zoom.us/j/96610738878?pwd=YUJWUVdQcXM1SXUrUFJ5TjR4VWk0dz09
Webinar ID: 966 1073 8878
Password: 502318

For Public Access Dial-in Information: **(669) 900-6833**
Webinar ID: 966 1073 8878
Password: 502318

To request accommodation or assistance to participate in this meeting, please contact Angie Ayers, at least 48 hours prior to the meeting date at: aayers@alamedactc.org

Meeting Agenda

1. Call to Order

2. Roll Call

3. Public Comment

		Page	Action
4.	**BPAC Meeting Minutes**		
4.1.	Approve February 4, 2021, BPAC Meeting Minutes	1	A
5.	**Regular Matters**		
5.1.	Transportation Development Act Article 3 Project Review	7	I
5.2.	City of Dublin Bicycle and Pedestrian Master Plan Update	11	I
5.3.	I-880 Whipple and Industrial Interchange Improvement Project	15	I
6.	**Organizational Meeting**		
6.1.	Election of Bicycle and Pedestrian Advisory Committee (BPAC) Officers for FY2021-22	27	A
6.2.	Approve the FY 2021-22 BPAC Calendar	29	A
7.	**Member Reports**		
7.1.	BPAC Roster	31	I
7.2.	Member Reports		I
8.	**Staff Reports**		
8.1.	Caltrans District 4 Bicycle Highways Study	33	I
9.	**Adjournment**		

Next Meeting: Thursday, July 15, 2021 (pending item 6.2)

Notes:

- All items on the agenda are subject to action and/or change by the committee.
- To comment on an item not on the agenda (3-minute limit), submit a speaker card to the clerk.
- Call 510.208.7450 (Voice) or 1.800.855.7100 (TTY) five days in advance to request a sign-language interpreter.
- If information is needed in another language, contact 510.208.7400. Hard copies available only by request.
- Call 510.208.7400 48 hours in advance to request accommodation or assistance at this meeting.
- Meeting agendas and staff reports are available on the website calendar.
- Comments from the public on agenized items must be received no later than 48 hours before the meeting in order to be distributed to BPAC members in advance of the meeting.
- Alameda CTC is located near 12th St. Oakland City Center BART station and AC Transit bus lines. Directions and parking information are available online.

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Alameda CTC Schedule of Upcoming Meetings
June 2021

Commission and Committee Meetings

Time	Description	Date
10:00 a.m.	Programs and Projects Committee (PPC)	June 14, 2021
11:30 a.m.	Planning, Policy and Legislation Committee (PPLC)	
1:00 p.m.	Alameda CTC Audit Committee	
2:00 p.m.	Alameda CTC Commission Meeting	June 24, 2021

Advisory Committee Meetings

1:30 p.m.	Alameda County Technical Advisory Committee (ACTAC)	June 10, 2021
1:30 p.m.	Paratransit Advisory and Planning Committee	June 28, 2021

Due to the statewide stay at home order and the Alameda County Shelter in Place Order, and pursuant to the Executive Order issued by Governor Gavin Newsom (Executive Order N-29-20), the Commission will not be convening at its Commission Room but will instead move to a remote meeting.

Meeting materials, directions and parking information are all available on the Alameda CTC website. Meetings subject to change.

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1. **Call to Order**
Bicycle and Pedestrian Advisory Committee (BPAC) Chair, Matt Turner, called the meeting to order at 5:30 p.m.

Chris Marks provided instructions to the Committee regarding the Zoom technology procedures, including instructions on administering public comments during the meeting.

2. **Roll Call**
A roll call was conducted and all members were present with the exception of Howard Matis. Matt Turner requested that Committee members introduce themselves and welcomed new members Chiamaka Ogwuegbu and Nick Pilch. Mr. Ogwuegbu and Mr. Pilch briefly introduced themselves to the other members of the BPAC.

3. **Public Comment**
There were no public comments.

4. **BPAC Meeting Minutes**
   4.1. **Approve November 18, 2020, BPAC Meeting Minutes**
   BPAC members requested the following amendments to the minutes:
   - Third paragraph from the bottom on page 2 change "…. will be high quality…." to "…. will build a high quality…."
   - Remove the second sentence under item 7.1.

   Feliz Hill made a motion to approve this item with amendments. Matt Turner seconded the motion. The motion passed with the following votes:

Yes:	*Fishbaugh, Hill, Johansen, Marleau, Murtha, Ogwuegbu, Pilch, Schweng, Turner*
No:	*None*
Abstain:	*None*
Absent:	*Matis*

5. **Regular Matters**
   5.1. **2020 Multimodal Performance Report and Bike/Ped Count Summary**
   Chris Marks stated that Alameda CTC analyses and presents data on the performance of Alameda County's multimodal transportation system, annually. Typically, these data are reported through modal fact sheets and a comprehensive presentation to the Commission and appropriate committees. The 2020 report, however focuses on the effects of COVID-19 and its impact to the transportation system. Mr. Marks states the purpose of this report is to explain emerging trends that

shape policy and decision-making throughout the agency. Typically, the annual performance report reflects multi-year shifts and gradual trends over a variety of important indicators. However, in 2020, the COVID-19 pandemic altered transportation in Alameda County so quickly and so radically that many of the standard instruments of measurement typically used for the performance report would fail to capture the current state of the system. The 2020 Multimodal Performance Report was developed using new methodologies to shed light on the transportation system with more real-time analysis of available metrics. The 2020 Multimodal Performance Report examines transportation as of early 2020, before the onset of the COVID-19 pandemic in Alameda County, and then presents available data for transit, autos, goods movement, and active transportation in the months following March 2020.

Chiamaka Ogwuegbu asked if Alameda CTC has micromobility or bike share data. Mr. Marks stated that scooter counts are available in conjunction with the countywide bicycle and pedestrian count program. He noted that micromobility activity is heavily concentrated in the City of Oakland and that the city maintains data agreements with the providers. Mr. Marks stated that bike share data is also available publicly which shows trip origins and destinations, but staff did not analyze those data as part of the 2020 performance report, specifically.

Ben Schweng asked if Uber data is included in the mode share. Mr. Marks stated that the mode share data provided during the presentation is from the latest US Census, American Community Survey (ACS) and specifically for primary commutes. The ACS does not allow responders to specifically identify rideshare services like Uber and Lyft. He noted that the ACS is exploring changes to the question to capture rideshare trips, possibly as soon as 2022.

Ben Schweng asked where Uber and Lyft do fit in to mode share. Mr. Marks noted that other data, collected before the pandemic, suggests that Uber and Lyft are not primarily used for commuting and that peak trips for those companies are mostly outside commuter hours in the evenings and on weekends.

Ben Schweng commented that he has noticed that Uber and Lyft trips are centered around students and workers with swing shift jobs.

Ben Schweng noted that during the pandemic bicyclists are primarily interested in biking on trails or bike paths and not on the street. Mr. Schweng noticed through his business that bike helmets and bicycles are selling quickly whereas locks are slow to sell. He inquired if people are opting for different routes as more network options are being created.

Nick Pilch asked if vehicle miles traveled (VMT) include data for bicycles Mr. Marks said no, VMT data does not include bicycles.

Nick Pilch asked if Alameda CTC has data related to speed limits. Mr. Marks says Alameda CTC collects actual speeds on roadways but not posted speed limits.

Nick Pilch asked if slow streets have anything to do where bicycles are being ridden and will it affect the bicycle count. Mr. Marks stated that Alameda CTC did not shift count locations for the 2020 cycle, and did not have specific data on slow streets. However, cities have collected data on the effectiveness of those programs.

Jeremy Johansen asked how many of the locations measure parks and trails access. Mr. Marks stated that most of the locations are not near parks and trails, and noted that East Bay Regional Parks District has automated counters at their locations.

Chiamaka Ogwuegbu asked how the current Comprehensive Investment Plan (CIP) cycle differs in terms of Alameda CTC's approach, programming, and the guidance given to the cities. Cathleen Sullivan stated that this is a limited CIP call and past cycles and that this cycle focused on bicycle, pedestrian, and transit improvement projects. She noted that usually, Alameda CTC's CIP calls are broader.

Matt Turner commented that walking and biking have increased during the pandemic. In the places where it is safe low stress, people are biking and walking and it's not the major corridors.

This item is for information only.

5.2. Alameda CTC 2021 Legislative Program

Maisha Everhart, Director of Communications and Government Affairs, provided an update on state and federal legislative activities. She reviewed President Biden's appointments and nominations for the Biden/Harris administration along with their priorities and plans for upcoming initiatives. Ms. Everhart informed the Committee that Pete Buttigieg had been nominated as the new Transportation Secretary and noted that the Democratic Party now has control in the Senate. Ms. Everhart stated that at the federal level, the $1.9 Trillion COVID relief bill continues to move forward and is anticipated to be approved by March 14, 2021. Ms. Everhart noted that the bill includes $30 Billion for transit. She stated that Congress is moving forward with a Surface Transportation bill with discussion starting this spring. Ms. Everhart stated the state legislature reconvened on January 11, 2021. The deadline for bills to be introduced is February 19, 2021. Once bills are introduced, staff will evaluate the bill and take the relevant legislation to the Commission for consideration. Ms. Everhart stated that Commission approved Alameda CTC's 2021 Legislative Program in January 2021. The purpose of the legislative program is to establish funding, regulatory, and administrative principles to guide Alameda CTC's legislative advocacy.

Chiamaka Ogwuegbu requested staff to share insights into advocacy for ongoing operating funding from the federal level. Ms. Everhart stated that Alameda CTC is advocating for funding, especially to support transit partners.

Chiamaka Ogwuegbu asked will there be sustainable funding for the long term. Ms. Everhart stated that it difficult to predict long-term at the moment. The financial position of transit operators will depend on factors like vaccinations and the pandemic abating. She noted that the Surface Transportation Bill and the Infrastructure Bill may provide additional operating funding.

David Fishbaugh requested clarification on automated speed control and the 85th percentile rule. Matt Turner noted that AB 43, Assemblymember Friedman Bill, will allow local jurisdictions to make changes in speed limits. Currently, the 85th percentile is how speed is measured. Ms. Sullivan stated that automated speed enforcement would be a more effective method of enforcing speed and is a way to serve equity from a policing standpoint.

This item is for information only.

5.3 Oakland Alameda Access Project Update

Chris Marks introduced Gary Huisingh and Gary Sidhu to provide an update on the Oakland-Alameda Access Project. Mr. Marks noted that BPAC was last updated on this project in July 2017 and the project was previously known as the I-880 Broadway/Jackson Interchange Project. Mr. Huisingh, Deputy Executive Director of Projects said the project has been in the planning stages for nearly 30 years due to the lack of consensus between key stakeholders. The Project is a named capital project in the 2000 Measure B and the 2014 Measure BB Transportation Expenditure Plans (TEPs). Mr. Huisingh stated that this project is located along I-880 between Oak Street and Washington Street in Oakland, including the Webster and Posey Tube, up to Atlantic Avenue in Alameda. The project will address certain bike and ped access needs between Oakland and Alameda. Mr. Sidhu stated that on September 29, 2020, the draft Environmental Impact Report/Environmental Assessment was made available for public review. A virtual public hearing was held on October 20, 2020, and had nearly 200 participants; numerous comments have also been received via mail, email, online forms, event chat function, and by phone. The 60-day public comment period ended on November 30, 2020, and environmental clearance for National Environmental Protection Act and California Environmental Quality Act is anticipated by late summer 2021. He noted that throughout the Project Approval & Environmental Document (PA&ED) phase, the project team coordinated with various stakeholders including the cities of Oakland, Alameda, Caltrans, Bike Walk Alameda, and Bike East Bay to go over the proposed bike and pedestrian improvements and seek their input.

Dave Murtha asked when will BPAC be able to see the designs. Mr. Sidhu stated that the design process is scheduled to begin in fall 2021, and staff will have a more detailed drawings available to share and get input on as early as fall 2022.

Feliz Hill asked what are the options available to close the gap in funding on this project. Mr. Sidhu that Alameda CTC and the other stakeholders will compete for state, local, and federal funding for this project.

Dave Murtha commented that BPAC would have liked to receive notification of the environmental analysis in October. He noted that more communications should take place with the BPAC.

Jeremy Johansen asked what are the project sponsors doing for public outreach and what can the public expect in the next year. Mr. Sidhu stated that regular information-sharing meetings will take place once the Environmental Impact Report process is complete. He noted that in the future, the project team will do a better job with their communications.

Matt Turner noted that there is a wide range of expertise on this Committee and the BPAC is looking forward to working with the design team on this project.

6. Member Reports

David Fishbaugh and Kristi Marleau requested staff to follow up on their expired appointments.

Nick Pilch reported that in Albany they are doing a San Pablo Avenue Specific Land Use Plan. He requested BPAC is included in the review of the Quarry Lakes Parkway project. Mr. Marks stated that the BPAC did review the Quarry Lakes Parkway project, previously the East West Connector Project, in November 2019 and there were many unanswered questions at the end of that discussion. He noted that the project sponsors reported they would come to BPAC at their next project milestone.

6.1. BPAC Calendar

The committee calendar is provided in the agenda packet for information purposes.

6.2. BPAC Roster

The committee roster is provided in the agenda packet for information purposes.

7. Meeting Adjournment

The meeting adjourned at 7:30 p.m. The next meeting is scheduled for Thursday, May 27, 2021, via Zoom.

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DATE:	May 20, 2021
TO:	Bicycle and Pedestrian Advisory Committee
FROM:	Chris G. Marks, Associate Transportation Planner
SUBJECT:	Transportation Development Act Article 3 Project Review

Recommendation

This item is to provide the Bicycle and Pedestrian Advisory Committee (BPAC) with an update and approve selected projects applying for Transportation Development Act (TDA) Article 3 funds, administered by the Metropolitan Transportation Commission.

Summary

The Countywide Bicycle and Pedestrian Advisory Committee (BPAC) is responsible for reviewing and providing input on select projects funded by TDA Article 3 in Alameda County. Jurisdictions must make all projects proposed to be funded by TDA Article 3 funds to a local or countywide BPAC for review and input. The BPAC last reviewed TDA 3 projects in Fiscal Year (FY) 2019-2020. MTC waived the BPAC review requirement for FY 2020-2021 because of the COVID-19 Pandemic. There are two proposed projects that must be reviewed by the Countywide BPAC for the FY 2021-2022 cycle. They are the City of Newark's Citywide Accessible Pedestrian Ramps and the City of Dublin's Safe Routes to Schools Crosswalk Improvements Program, described below.

Background

TDA Article 3 is a funding source administered by the Metropolitan Transportation Commission (MTC) annually and made available to local agencies for use on bicycle and pedestrian infrastructure projects. In response to COVID-19, MTC now allows jurisdictions to apply TDA 3 funds to quick build projects. Funding is allocated by formula according to population in each jurisdiction, and jurisdictions may spend funds or roll them over to a future year. MTC requires that all projects submitted for funding be reviewed by a Bicycle/Pedestrian Advisory Committee (BPAC) and several jurisdictions in Alameda County use the Alameda CTC Countywide BPAC for this purpose.

The TDA Article 3 Pedestrian and Bicycle Program funding allocation for the upcoming fiscal year in Alameda County is $2,359,113. Attachment A shows the distribution of the FY 2021-2022 TDA Article 3 funding among cities.

This year two jurisdictions are requesting the Countywide BPAC to review their projects: the City of Dublin and the City of Newark. Their projects are summarized below. All other jurisdictions have either elected to roll-over TDA Article 3 funds for future years or will use a local BPAC for project review. Historically, two other jurisdictions have used the Countywide BPAC for this purpose; this year Unincorporated Alameda County will use their new local BPAC and the City of Hayward has elected to roll over FY 21-22 funds. Staff from Dublin and Newark will be available to present the proposed projects at the May 27th BPAC meeting and answer questions.

City of Newark: Citywide Accessible Pedestrian Ramps

The City of Newark will reconstruct and install accessible pedestrian ramps at various intersections located throughout the City of Newark, in compliance with current Americans with Disabilities Act (ADA) standards. Retaining curbs, if necessary, will be placed outside of the sidewalk width to reduce tripping hazards. The TDA funding request is $184,535.

City of Dublin: Safe Routes to School – Crosswalk Improvements Program

The City of Dublin is scoped to design, develop plans, specifications, cost estimates, and install Rectangular Rapid Flashing Beacon (RRFB), ADA curb ramp upgrades, and bulb outs at three uncontrolled crosswalk locations: 1) Amador Valley Blvd. at Burton St., 2) Central Pkwy. at Aspen St., and 3) Grafton St. at Antone Wy. The proposed project is expected to create safer crossings and improve accessibility at each location, as well as encourage students to walk and bike more. The three project locations are in the immediate vicinity of multiple schools: Dublin High School, Frederiksen Elementary School, Wells Middle School, Dougherty Elementary School, Green Elementary School and Fallon Middle School.

The proposed projects were developed through Walk Audits conducted for each school, funded by Alameda CTC's Safe Routes to Schools Program. Walk Audits include in-field observations and feedback from stakeholders including the Dublin Unified School District, Dublin Police Services, City of Dublin staff, school administrators, parents, students, and traffic engineering and transportation planning professionals. Recommendations from the Walk Audits were refined based on guidance in the City of Dublin's latest approved Bicycle and Pedestrian Master Plan as well as detailed engineering review. The TDA funding request is $188,038.

Fiscal Impact: There is no fiscal impact. This is an information item only.

Attachment:

A. Fiscal Year 21/22 TDA Article 3 Program – Funding Allocation and List of Projects

EXHIBIT A - FY 21/22 TDA Article 3 Program - List of Projects - March 26, 2021					
Agency	Proposed Projects	FY21/22 TDA Funding Program	Previous Amounts	FY 21/22 **Total** Allocation	Carryover Funding FY22/23
PA1					
City of Alameda	No project submitted for FY 21/22	$80,940	-$7,932	$0	$73,008
Albany	Ohlone Greenway Trail Access/Masonic InterstnImp	$18,850	$90,233	$109,083	$0
Berkeley	Bike Plan Update and Vision Zero Quick Build Projects	$122,020	$361,920	$450,000	$33,940
Emeryville	No project submitted for FY 21/22	$12,242	$22,634	$0	$34,876
Oakland	Foothill Blvd Ped safety Imp	$431,714	$370,867	$360,000	$102,581
	E.20th Stairs path			$150,000	
	Burr, Wilson, & Palmer Stairpath Rehab			$115,000	
	City Racks Bike Parking Program			$75,000	
Piedmont	ADA Ramps & Sidewalk Impr various locations	$11,401	$21,534	$32,935	$0
	PA1 Total			**$1,292,018**	
PA2					
Hayward	No project submitted for FY 21/22	$159,578	$29,330	$0	$188,908
San Leandro	ADA Ped Curb Ramps and Ped Crossing Equipment	$87,528	$17,534	$105,062	$0
	PA2 Total			**$105,062**	
PA3					
Fremont	Fremont Blvd & County Dr Protected Intersection	$233,149	-$65,147	$368,002	-$200,000
Newark	Citywide ADA Ped Ramps	$48,742	$135,793	$184,535	$0
Union City	No project submitted for FY 21/22	$73,300	$483,374	$0	$556,674
	PA3 Total			**$552,537**	
PA4					
Dublin	SR2S - Crosswalk Improvements	$65,416	$122,622	$188,038	$0
Livermore	No project submitted for FY 21/22	$91,441	-$3,395	$0	$88,046
Pleasanton	No project submitted for FY 21/22	$79,101	-$22,551	$0	$56,550
	PA4 Total			**$188,038**	
COUNTY					
County Alameda	Pedestrian Improvement project at various locations	$267,428	-$45,970	$221,458	$0
	County Total			**$221,458**	
	Total	***$1,782,850***	***$1,510,846***	***$2,359,113***	***$934,583***

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DATE:	May 20, 2021
TO:	Bicycle and Pedestrian Advisory Committee
FROM:	Cathleen Sullivan, Director of Planning Chris G. Marks, Associate Transportation Planner
SUBJECT:	City of Dublin Bicycle and Pedestrian Master Plan Update

Recommendation

This item is to provide the Bicycle and Pedestrian Advisory Committee (BPAC) with an update on the City of Dublin's Bicycle and Pedestrian Master Plan. This item is for information only.

Summary

One of the main roles of the Countywide BPAC is to advise local jurisdications and regional agencies as they develop and update Pedestrian and Bicycle Master Plans and Active Transportation Plans. The City of Dublin started developing their Bicycle and Pedestrian Master Plan in 2019 to update and replace the City's 2014 Citywide Bicycle and Pedestrian Master Plan. The BPAC was last updated on the Master Plan in September 2020. This memo gives an update on project activities since the last update which include: community engagement efforts, refinement of the existing conditions and needs analysis, plan recommendations and implementation plan. Staff will be available to present information and answer questions at the May 27th BPAC meeting.

Background

The City of Dublin's Bicycle and Pedestrian Master Plan (Plan) is a critical planning, policy, and implementation document that supports the City's efforts to improve safety and attractiveness of biking and walking as a means of transportation and recreation. Staff have continued to outreach and refined the technical elements of the plan. Staff have indicated that a draft plan will be available later in 2021, and will be made available to the BPAC for review. This memo provides details on key areas of work since the September 2020 update:

Community Engagement

Community engagement is one of the key components of the City of Dublin's Master Plan update. City staff have engaged the community via virtual focus groups and

meetings to accommodate the challenge of the COVID-19 pandemic. A project website was developed to reach a wider audience and get the necessary input from the community; this was shared at the September 2020 BPAC meeting. The project website – https://dublinbikeped.org – includes an interactive map that allows respondents to provide geographic input on key issues and opportunity locations for biking and walking throughout Dublin. The website is periodically updated and continues to receive feedback.

With changes in local public health guidance, the project team is planning a round of in-person engagement activities for the next phase of the Plan update. Recent and upcoming engagement include the following:

- On March 9, 2021 a listening session was held with the Dublin's Chamber of Commerce
- In partnership with Bike East Bay, a pop-up event is being planned to seek feedback from trail users at the Alamo Creek trailhead on Saturday, May 22 as part of National Bike Month Activities
- In-person outreach is being planned at the Dublin Farmer's Market on Thursday, May 27
- An expanded survey is being developed to administer at pop-up events, on the project website, and on social media channels
- The next technical advisory committee meeting is being planned for early June

Additional engagement and outreach activities will be conducted throughout the remainder of the planning process.

Existing Conditions and Needs Analysis

The City of Dublin shared results from the existing conditions and needs analysis at the September BPAC meeting. The final task of that effort is a latent demand analysis to account for biking and walking activity that could be realized through infrastructure improvements. That analysis is currently being finalized. The analysis attempts to answer the question: "How much potential mode shift (to walking and biking from other modes) could be expected from infrastructure improvements in Dublin?" The analysis uses residential locations and demographic data in Dublin to calculate travel distance to BART stations, schools, parks, and job centers in the City. Mode share estimates are derived based on demographics, distance to destination, and infrastructure quality characteristics[1]. Because the methodology is sensitive to the City's demographics and infrastructure, results will allow the City to identify high-leverage improvement locations for greater mode shift potential.

The analysis will compare existing conditions and an improved network. It will identify locations that demonstrate high potential to increase mode shift to walking and biking.

[1] These data include BART station profile access surveys, Safe Routes to School assessment mode share survey data, National Household Travel Survey (NHTS) data, and American Community commute travel mode data.

High-leverage locations for improvement identified in the demand analysis will be used in project prioritization (discussed in the next section).

Recommendations & Implementation Plan

The City of Dublin has continued to review the prioritization framework and develop Program and Policy Recommendations. Prioritization of roads and paths in the City can identify corridors or locations that provide the greatest potential benefit by connecting key destinations to help meet Plan goals.

Following are the draft prioritization factors and evaluation criteria:

- Safety
- Social equity
- Connectivity
- Quality of service
- Major barriers
- Consistency with past planning

Once the factors are evaluated, appropriate weighting is applied to each factor. The process will identify prioritized and logical biking and walking corridors that can form the basis for project identification. That process will inform the project recommendations and implementation plan.

The City of Dublin also reviewed bike- and pedestrian-related programs and policies from relevant planning documents and conducted benchmarking interviews with staff from seven City departments and the Dublin Unified School District to develop an updated inventory of existing programs and policies relevant to biking and walking and identify gaps or needs that could be addressed by the Plan.

The following key themes emerged:

- Need for additional resources, including staff dedicated to active transportation
- Desire for updated design standards
- Need for enhanced coordination across departments
- Need for clear processes and stronger policies related to maintenance, design review
- Project implementation

The City of Dublin then used information from the existing conditions inventory and informational interviews to develop policy and program recommendations and develop targeted actions. The recommendations will consist of existing programs and policies that should be continued and programs and policies the City should initiate to achieve the project goals. A matrix of draft programs and policies is currently under review.

Next Steps

Throughout the summer, the City of Dublin will complete the demand analysis and network prioritization. From there, they will identify near-term and long-term projects to close gaps in the network, improve access to school, increase connectivity across jurisdictional borders and across freeways and major arterials, provide first and last mile connections to transit, and enhance safety and comfort for people walking and biking.

Following the network recommendations, the City of Dublin will develop cost estimates, identify revenue sources, and develop an implementation plan. This work will occur in the fall of 2021.

Fiscal Impact: There is no fiscal impact. This is an information item only.

DATE:	May 20, 2021
TO:	Bicycle and Pedestrian Advisory Committee
FROM:	Gary Huisingh, Deputy Executive Director of Projects Joy Sharma, Director of Project Delivery
SUBJECT:	I-880 Whipple and Industrial Interchange Improvement Project

Recommendation

This item is to provide the Bicycle and Pedestrian Advisory Committee (BPAC) with an update on the I-880 Interchange Improvements at Whipple Road/Industrial Parkway Southwest and Industrial Parkway West, including key project milestones and next steps, and seek input in the selection of a preferred alternative.

Summary

The Alameda County Transportation Commission (Alameda CTC) is the project sponsor and implementing agency for the I-880 Interchange Improvements (Whipple Road/Industrial Parkway Southwest and Industrial Parkway West) Project located in the Cities of Hayward and Union City. The Project is comprised of two named projects in the 2014 Transportation Expenditure Plan: I-880 Whipple Road/Industrial Parkway Southwest Interchange Improvements and I-880 Industrial Parkway Interchange Improvements. Improvements are proposed to the interchanges along I-880 at Whipple Road/Industrial Parkway Southwest and Industrial Parkway West ranging from operational improvements to the ramps to complete replacement of the undercrossing/overcrossing structures to relieve freeway and interchange congestion, enhance safety, improve business access, and provide new shared pedestrian and bicycle paths along the north and south side of the crossing structures.

The project is currently in the Project Approval & Environmental Document (PA&ED) phase and the draft environmental document (Environmental Impact Report/ Environmental Assessment) was released on January 20, 2021. The public comment period ended on March 5, 2021. The Project Development Team is expected to select a preferred alternative in June 2021, and environmental clearance under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) is anticipated by September 2021. Subsequent to CEQA and NEPA approval, the project will proceed to the detailed design phase, anticipated to begin in fall 2021.

Proposed pedestrian and bicycle improvements have been shared with pedestrian/bicycle groups and stakeholders including Bike East Bay, Caltrans pedestrian and bicycle coordinator, City of Union City Bike and Pedestrian Advisory Committee, City of Hayward and Union City Council members. Further coordination with various stakeholders will continue throughout the detailed design phase.

Background

I-880 is a major barrier to east-west bicycle and pedestrian connectivity in southern Alameda County. The interchanges at I-880/Whipple Road and Industrial Parkway Southwest (SW) do not have striped bike lanes and sidewalks either have gaps or do not conform to Americans with Disabilities Act (ADA) standards. However, several bicycle facilities terminate as they approach the interchanges. Currently, the high-speed free-flowing ramps are not conducive to low-stress bicycle or pedestrian connections through the interchanges.

Both intersections also currently exceed capacity. Congestion occurs on a daily basis during both the morning and afternoon commute hours and traffic is forecasted to increase up to 15 percent by 2045. Congestion is compounded by the lack of a northbound off-ramp at the adjacent I-880/Industrial Parkway West interchange. As such, northbound traffic wishing to access Industrial Parkway and the City's primary industrial areas must exit at Whipple/Industrial Parkway SW and access Industrial Parkway West through local streets. Improvements are needed at both interchanges to address current and future demand and to improve pedestrian and bicycle connectivity.

Build Alternatives

Several build alternatives are being studied in the Draft Environmental Document. These are shown in the Project Build Alternatives (Attachment A) and Project Fact Sheet (Attachment B) and described below. The alternatives designs will be reviewed with the BPAC at the May meeting to get input.

Whipple Road-Industrial Parkway SW Interchange

A build alternative and design variation are being considered at the Whipple Road-Industrial Parkway Southwest Interchange. The build alternative would replace the three existing I-880/Whipple Road undercrossing structures with one undercrossing structure along mainline I-880, improve bicycle and pedestrian facilities through the interchange area along Whipple Road, and include improvements to the interchange and local road network including:

- Replace the current I-880 mainline structure, the northbound I-880 on-ramp structure, and the southbound I-880 off-ramp structure along mainline I-880 with one continuous undercrossing bridge structure. The new structure would increase the vertical clearance between I-880 and Whipple Road from 14 feet 10 inches (current) to a minimum of 15 feet.

- Widen Whipple Road between Industrial Parkway SW and Dyer Street from five lanes to eight lanes (three westbound lanes and five eastbound lanes).
- Construct dedicated bicycle facilities and pedestrian sidewalk along the north and south side of Whipple Road, between Dyer Street and Industrial Parkway SW.
- Add an auxiliary lane on northbound I-880 from the Alvarado Niles Road interchange to the Whipple Road-Industrial Parkway SW interchange.
- Realign and widen the northbound I-880 loop on-ramp from Whipple Road and "square-up" the ramp terminus intersection.
- Realign the northbound I-880 diagonal on-ramp to "square-up" the ramp terminus intersection.

The Design Variation would preserve the three existing Whipple Road Undercrossing structures along mainline I-880 and make improvements to the interchange and local roads within the constraints of the existing structures. This design variation includes the ramp and auxiliary lane modification improvements, in addition to the following improvements:

- Restripe Whipple Road near the Industrial Parkway SW Intersection to improve left turn movements from Eastbound Whipple Road to Northbound Industrial Parkway Southwest.
- Widen Industrial Parkway SW to 6 lanes north of the Whipple Road intersection.
- Widen the existing sidewalk along the north and south side of Whipple Road to accommodate pedestrians and bicycles on shared multi-use paths by constructing retaining walls at the existing undercrossing bridge abutments.

Industrial Parkway West Interchange

At the I-880/Industrial Parkway West interchange, three build alternatives are being evaluated:

Build Alternative 1 would replace the existing I-880/Industrial Parkway West overcrossing and the northbound and southbound I-880 ramps to Industrial Parkway West would be reconfigured to a tight diamond (Type L-1) interchange. The following key improvements are proposed:

- Replace the I-880/Industrial Parkway West overcrossing with a structure to the north. The new structure would accommodate seven lanes of traffic and include dedicated bicycle facilities and sidewalks in both directions.
- Construct a new two-lane northbound I-880 diagonal off-ramp to Industrial Parkway West.
- Approximately 1,000 linear feet of Ward Creek would be realigned 75 feet east to accommodate the new northbound I-880 off-ramp to Industrial Parkway West.

- Convert the outside northbound 5th lane to a northbound auxiliary lane between the Whipple Road on-ramp and Industrial Parkway West off-ramp.
- Realign and widen the northbound I-880 diagonal on-ramp to connect with the new I-880/Industrial Parkway West overcrossing.
- Construct a new southbound I-880 diagonal on-ramp from Industrial Parkway West
- Remove the existing southbound I-880 loop on-ramp.
- New traffic signals at the ramp intersections with Industrial Parkway West.

Build Alternative 2 is identical to Build Alternative 1, except for the proposed southbound I-880/Industrial Parkway West on-ramp and off-ramp configurations. Instead of demolishing the existing loop on-ramp to southbound I-880 and replacing it with a diagonal on-ramp, Build Alternative 2 would leave the existing loop on-ramp from westbound Industrial Parkway West in place and widen the ramp to add a High Occupancy Vehicle (HOV) preferential lane in addition to the one general purpose lane. Build Alternative 2 would add a new two-lane diagonal on-ramp to southbound I-880 that would diverge from eastbound Industrial Parkway West and merge with the southbound loop on-ramp after the meter point before the merge onto southbound I-880. The southbound diagonal on-ramp in Build Alternative 2 differs from the on-ramp proposed under Build Alternative 1 in terms of its footprint and the resulting intersection with Industrial Parkway West that is free flow versus a signalized intersection for Build Alternative 1.

Build Alternative 3 is identical to Build Alternatives 1 and 2, except for the proposed southbound I-880/Industrial Parkway West on-ramp and off-ramp configurations. Unlike Build Alternative 1 and 2, Build Alternative 3 would retain the existing loop on-ramp as the only southbound on-ramp at the Industrial Parkway West interchange. The southbound loop on-ramp would be realigned and widened to provide for three lanes. Compared to Build Alternative 1 and 2, the I-880/Industrial Parkway West southbound off-ramp would be realigned further west and widened to accommodate retention and widening of the existing southbound loop-on ramp while providing necessary lane improvements to accommodate southbound traffic.

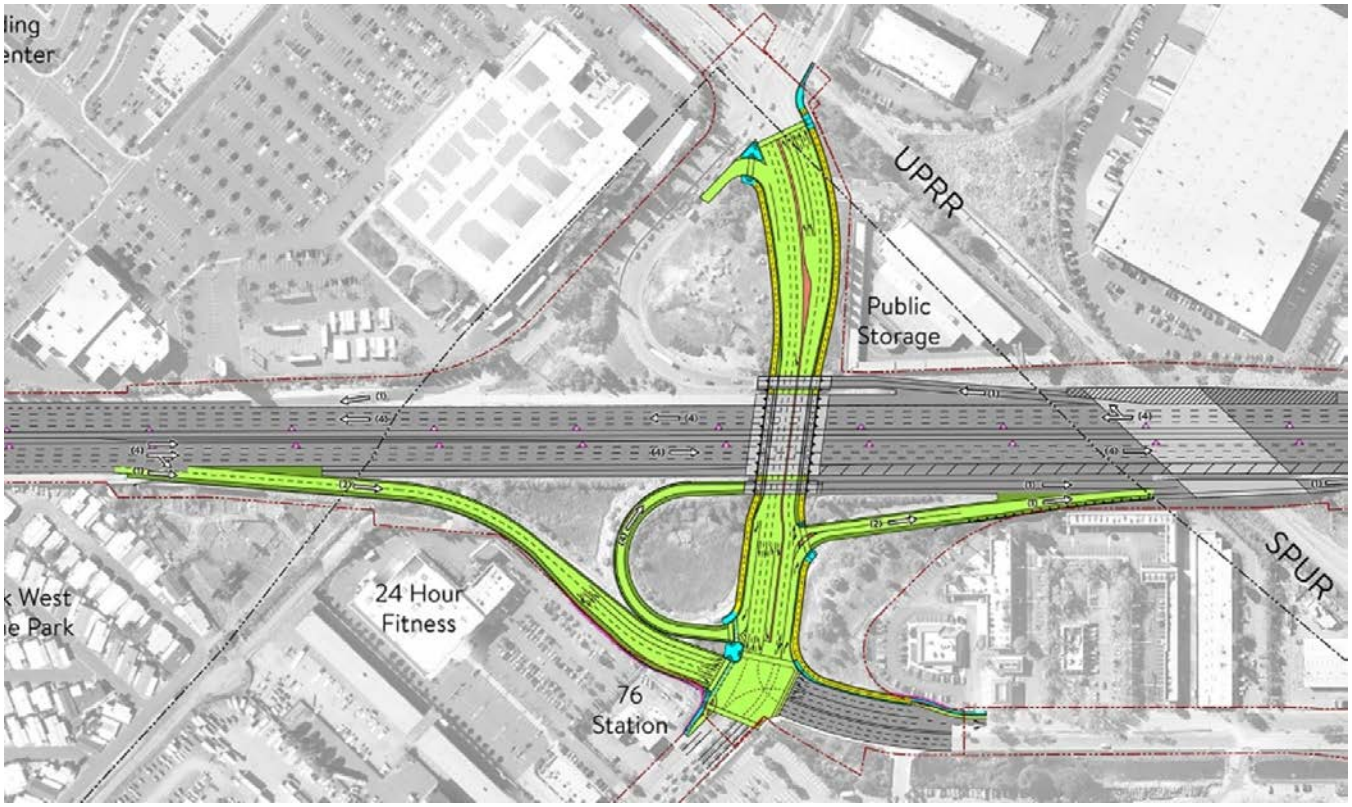
Fiscal Impact: There is no fiscal impact. This is an informational item only.

Attachments:

A. Project Build Alternatives
B. Project Fact Sheet

I-880 Whipple Road-Industrial Parkway Southwest Interchange – Build Alternative

I-880 Whipple Road-Industrial Parkway Southwest Interchange – Design Variation



I-880 Industrial Parkway West Interchange – Alternative 1

I-880 Industrial Parkway West Interchange – Alternative 2

I-880 Industrial Parkway West Interchange – Alternative 3

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Interstate 880 Interchange Improvements (Whipple Road/Industrial Parkway Southwest and Industrial Parkway West)

5.3B

MARCH 2021

PROJECT OVERVIEW

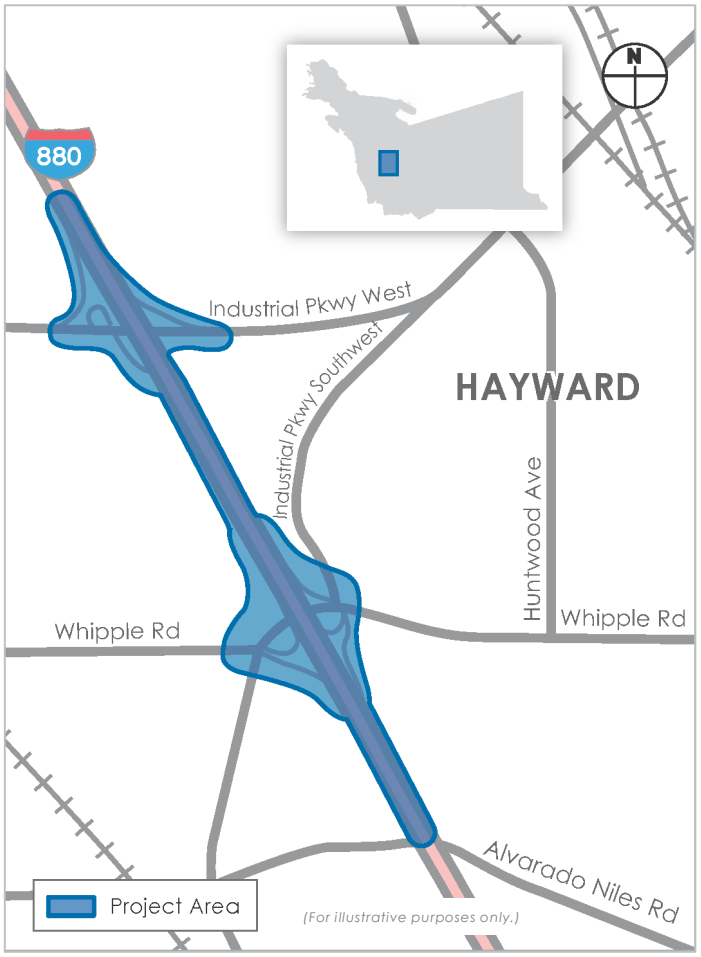
The Alameda County Transportation Commission (Alameda CTC), in cooperation with the California Department of Transportation (Caltrans), will implement full interchange improvements at the Interstate 880 (I-880)/Whipple Road interchange and Industrial Parkway West interchange, including:

- A northbound off-ramp to Industrial Parkway West
- A southbound high occupancy vehicle (HOV) bypass lane on the southbound loop off-ramp
- Bridge reconstruction over I-880
- Surface street improvements and realignment

Due to their close proximity, improvements at both interchanges are being developed as a single project.

PROJECT NEED

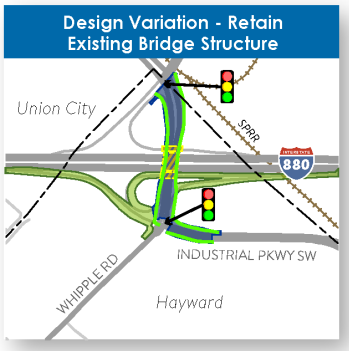
- I-880/Whipple Road ramp intersections currently operate at or over capacity, with a few movements experiencing high delay during a.m. and p.m. peak hours.
- Observed queues for the northbound off-ramp approach at Whipple Road occasionally extend to the mainline.
- The Whipple Road–Industrial Parkway South West interchange was identified by the cities of Union City and Hayward as needing bicycle and pedestrian improvements to enhance the connectivity between the east and west sides of I-880.
- There is no designated bicycle facility along Whipple Road or Industrial Parkway at I-880, and the sidewalk along the north side of Whipple Road is narrow.
- The pavement condition of Whipple Road within the Caltrans right-of-way is degraded and is in need of major rehabilitation.



PROJECT BENEFITS

- Relieves freeway and interchange congestion
- Enhances safety
- Improves local business access along Whipple Road
- Improves bicycle and pedestrian access across the I-880 freeway
- Improves transit access to and from the I-880 freeway

WHIPPLE ROAD INTERCHANGE ALTERNATIVES



LEGEND

- Roadway Improvements
- New Freeway Ramps
- Modified Freeway Ramps
- Replace Bridge Structure
- Retain Bridge Structure
- Enhanced Bike Facilities
- Modified Traffic Signal

INDUSTRIAL PARKWAY SW INTERCHANGE ALTERNATIVES

COST ESTIMATE BY PHASE ($ X 1,000)

Planning/Scoping	$1,000
PE/Environmental	$5,250
Final Design (PS&E)	$15,250
Right-of-Way	$20,000
Construction	$178,500
Total Expenditures	**$220,000**

Note: Construction estimate is projected to the mid-year of construction, 2025.

FUNDING SOURCES ($ X 1,000)

Measure BB	$104,000
Federal	TBD
State	TBD
Local	TBD
TBD	$116,000
Total Revenues	**$220,000**

Note: Measure BB funding is subject to future Commission approval.

STATUS

Implementing Agency: Alameda CTC

Current Phase: Preliminary Engineering/Environmental (PE/Environmental)

- Feasibility Study was completed in May 2016.
- Project Study Report-Project Development Support(PSR-PDS) was completed in August 2018.
- Draft Environmental Document was released for public review in January 2021 and a virtual public meeting was held in February 2021.
- Final Environmental Document and Project Report Approval is anticipated in September 2021

SCHEDULE BY PHASE

	Begin	End
Scoping	Fall 2017	Summer 2018
PE/Environmental	Summer 2018	Summer 2021
Final Design	Fall 2021	Spring 2024
Right-of-Way	Fall 2021	Spring 2024
Construction	2024	2027

Note: Project schedule subsequent to the preliminary engineering/ environmental phase is contingent on funding availability for future phases.

PARTNERS AND STAKEHOLDERS

Caltrans, Alameda CTC, and the cities of Hayward and Union City

Note: Information on this fact sheet is subject to periodic updates.

DATE:	May 20, 2021
TO:	Bicycle and Pedestrian Advisory Committee
FROM:	Cathleen Sullivan, Director of Planning Chris G. Marks, Associate Transportation Planner
SUBJECT:	Election of Bicycle and Pedestrian Advisory Committee (BPAC) Officers for FY2021-22

Recommendation

It is recommended that the Bicycle and Pedestrian Advisory Committee (BPAC) elect a BPAC Chair and Vice-Chair for FY2021-22.

Summary

Per the current BPAC bylaws, BPAC members must elect a Chair and Vice-Chair once per year. Elections are usually held at the last meeting before the beginning of the new fiscal year. In 2020, due to the COVID-19 pandemic and cancellation of the spring 2020 meeting, officer elections were last held in September 2020, the first meeting of fiscal year 2020-2021. This memo summarizes the roles and responsibilities of the Chair and Vice-Chair positions. Currently, Matt Turner is the Chair and Kristi Marleau is the Vice-Chair.

Background

The applicable sections from the current BPAC bylaws are included below which describe the duties of the Chair and Vice-Chair positions.

4.1 Officers. The BPAC shall annually elect a Chair and Vice-Chair. Each officer must be a duly appointed member of the BPAC.

4.1.1 Duties. The Chair shall preside at all meetings and will represent BPAC before the Commission to report on BPAC activities. The Vice-Chair shall assume all duties of the Chair in the absence of, or on the request of, the Chair. In the absence of the Chair and Vice-Chair at a meeting, the members shall, by consensus, appoint one member to preside over that meeting.

4.2 Office Elections. Officers shall be elected by the members annually at the Organizational Meeting or as necessary to fill a vacancy. An individual receiving a

majority of votes by a quorum shall be deemed to have been elected and will assume office at the meeting following the election. In the event of multiple nominations, the vote shall be by ballot. Officers shall be eligible for re-election indefinitely.

Responsibilities of Chair and Vice-Chair

As noted above, the Chair (or in their absence the Vice-Chair) is expected to preside over BPAC meetings. This includes agenda planning and meeting preparation in coordination with Alameda CTC staff. The Chair (or Vice-Chair) is also expected to attend the Alameda CTC Commission meetings to report on any BPAC meetings or activities that have occurred since the last report to the Commission. If there have been no recent BPAC meetings, the Chair does not need to attend the Commission meeting. Currently the Commission meetings take place at 2:00 p.m. on the fourth Thursday of each month. Due to the COVID-19 pandemic, Commission meetings are currently being held via Zoom.

Fiscal Impact: There is no fiscal impact associated with the requested action.

Alameda County Transportation Commission

Bicycle and Pedestrian Advisory Committee

DRAFT Meeting Schedule for 2021-2022 Fiscal Year

May 27, 2021

	Meeting Date	Meeting Purpose
1	Thursday Jul 15, 2021	• City of Dublin Bike/Ped Draft Master Plan • I-880 Interchange Improvements: Winton Ave/A Street
2	Thursday October 21, 2021	• Caltrans D4 Bicycle Highways Study • East 14th Multimodal Corridor Project
3	Thursday January 20, 2022	• One Bay Area Grant Program: Cycle 3
4	Thursday April 28, 2022	• TDA Article 3 Project Review • Fiscal Year Organizational Meeting • Annual Performance Report

Other Potential Future Topics:

- I-80/Ashby Interchange Project
- Oakland/Alameda Access Project
- San Pablo Avenue Multimodal Corridor Project
- MTC Regional Active Transportation Plan
- East Bay Greenway

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Alameda County Transportation Commission
Bicycle and Pedestrian Advisory Committee
Roster and Attendance Fiscal Year 2020-2021

	Suffix	Last Name	First Name	City	Appointed By	Term Began	Re-apptmt.	Term Expires
1	**Mr.**	**Turner, Chair**	**Matt**	**Castro Valley**	**Alameda County Supervisor Nate Miley, District 4**	**Apr-14**	**Dec-19**	**Dec-21**
2	**Ms.**	**Marleau, Vice Chair**	**Kristi**	**Dublin**	**Alameda County Mayors' Conference, D-1**	**Dec-14**	**Jan-19**	**Jan-21**
3	Mr.	Fishbaugh	David	Fremont	Pending Commission Approval Alameda County Supervisor David Haubert, District 1	Jan-14	Mar-19	Mar-21
4	Ms.	Hill	Feliz G.	San Leandro	Alameda County Supervisor Wilma Chan, District 3	Mar-17	Jul-19	Jul-21
5	Mr.	Johansen	Jeremy	San Leandro	Alameda County Mayors' Conference, D-3	Sep-10	Feb-20	Feb-22
6	Mr.	Matis	Howard	Berkeley	Alameda County Supervisor Keith Carson, District 5	Sep-19		Sep-21
7	Mr.	Murtha	Dave	Hayward	Alameda County Supervisor Richard Valle, District 2	Sep-15	Jun-19	Jun-21
8	Mr.	Ogwuegbu	Chiamaka	Oakland	Alameda County Mayors' Conference, D-4	Jan-21		Jan-23
9	Mr.	Pilch	Nich	Albany	Alameda County Mayors' Conference, D-5	Jan-21		Jan-23
10	Mr.	Schweng	Ben	Alameda	Alameda County Mayors' Conference, D-2	Jun-13	Jul-19	Jul-21

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DATE:	May 20, 2021
TO:	Bicycle and Pedestrian Advisory Committee
FROM:	Chris G. Marks, Associate Transportation Planner
SUBJECT:	Caltrans District 4 Bicycle Highways Study

Recommendation

This item is to provide the Bicycle Pedestrian Advisory Committee (BPAC) with information related to the California Department of Transportation's (Caltrans') District 4 Bicycle Highways Study. This item is for information only.

Summary

One of the main roles of the Countywide Bicycle and Pedestrian Advisory Committee (BPAC) is to advise regional agencies as they develop and update countywide and regional Pedestrian- and Bicycle-related Plans. In late 2020, the California Department of Transportation (Caltrans) District 4, which covers the nine bay area counties, launched it's District 4 Bicycle Highways Study.

Staff from Caltrans District 4 plans to present a full update and be available to answer questions at a future meeting in 2021. However, with initial outreach efforts underway, the project team has requested assistance from regional stakeholders, like the Countywide BPAC, to solicit input on the project. Staff conducted an initial survey from February 4 through March 5, 2021 which gathered more than 5,800 responses. A summary of initial survey efforts is included in Attachment A. Caltrans staff has also made some technical materials on the effort available which are included in Attachment B. The project team has also provided a template newsletter and social media content for circulation, inluded as Attachments C and D. These templates reference the initial survey period, but may be adapted for future opportunities for engagement.

Fiscal Impact: There is no fiscal impact. This is an information item only.

Attachments:

A. Caltrans Bay Area Bicycle Highways Survey Summary Key Themes
B. Bicycle Highways Best Practices Review
C. E-Newsletter Template
D. Social Media Template

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Caltrans Bay Area Bike Highway Survey Summary Key Themes

Caltrans Bay Area is evaluating the implementation of bike highways in the Bay Area. From February 4 to March 5, 2021, the project team promoted a survey to stakeholders within the nine county Caltrans Bay Area (formerly D4) region. The goals of the survey were to:

- Solicit feedback on what features would make bike highways safe and easy to use for a broad level of bicyclists
- Understand current bicycling habits
- Understand barriers to bicycling
- Increase awareness of the Caltrans Bay Area Bike Highway Study

More than 5,800 responses were gathered in English (N=5,748) and Spanish (N=72). A summary of key themes that emerged surrounding people's bicycling habits and preferences, as well as design and safety features is provided below.

Key Takeaways

- The majority of respondents bicycled or used other forms of micromobility "often" or "always" both before and after Covid-19 restrictions were in place. This suggests that there is a large population who may be interested in using a bike highway within the Bay Area.
- The top two reasons respondents listed as to why respondents do not bicycle more often are 1) concerns about physical safety from traffic and 2) a lack of comfortable bikeways or roads connecting to desired destinations. Concerns were also raised that bike highways could provide a space for homeless encampments. These factors will be important to consider within the bike highway design process.
- The most favored design option is a bicycle highway that is separated from vehicular traffic. Thus, designs that separate users from vehicular traffic should be a priority.

- The majority of respondents felt that people walking, riding e-bikes/scooters, or using a mobility device should be allowed to use the bike highway when possible. However, in addition to creating a facility that is separate from traffic, separation between people walking/using a mobility device ranked as one of the most important design elements to respondents. Thus, design elements that separate users from vehicle traffic and accommodate different types of users should be a priority.
- It was important to respondents that the bike highway either improves an existing route or creates an entirely new one, providing bicycle access to areas where it previously was unavailable. Suggestions included creating a bike highway between San Mateo and downtown San Francisco, or from the East Bay to San Francisco.

Summary of Key Themes

Frequency and Purpose of Bicycle Trips
The majority of respondents bicycled or used other forms of micromobility "often" or "always" both before and after Covid-19 restrictions were in place. The majority of respondents said they would use a bike highway for multiple purposes, including to get somewhere, for fun, and for health/exercise. Additional reasons people bicycled included mental health/stress relief and the desire to reduce environmental impact. It was also noted that bicycling provided a way to avoid public transportation and potential COVID-19 risk.

Safety Concerns
Concerns about physical safety from traffic and a lack of comfortable bikeways or roads connecting to desired destinations were the top two reasons respondents said they don't bicycle more often. When asked what safety concerns they had surrounding a bike highway, respondents similarly noted concerns about conflicts with car traffic and the speed of adjacent car traffic, in addition to a lack of safe access to a bike highway. Additional safety concerns included the presence of people walking and homeless encampments in and around bike trails, lack of secure bicycle parking at destinations, and fear of their bike being stolen. Suggestions for increasing safety included ensuring there is continued maintenance and security at the facility, such as through trail etiquette signs, having a patrol system, and installing security cameras and emergency phones.

Other Forms of Mobility
The majority of respondents felt that people walking or using a mobility device should be allowed to use the bike highway when possible, and that it should also be open to devices such as electric bicycles, electric scooters, and skateboards. While those who opposed allowing other forms of mobility were in the minority, common reasons respondents identified for opposition included differences in speed between different modes, which could increase the likelihood of collisions, other forms preventing bicyclists from travelling at higher speeds, and that people walking or using mobility devices can use the sidewalk. There was also some concern that e-bikes and other motorized forms of transit would travel too fast, and that they should use existing car lanes instead.

Design Elements
The design elements respondents ranked as most important were creating a facility that was separate from traffic, and separation between people walking/using a mobility device. This preference for a fully-dedicated facility was evident across several questions. Similarly, when asked what would be most important to respondents if a bike highway was developed in their community, a facility that was fully separated from car traffic was also the top choice, followed by a facility that provides a direct route to and from key destinations. Additional comments included the preference for a fast, uninterrupted route, the ability to have enough room to pass travelers at other speeds, creating a facility not directly adjacent to highways or other roads with lots of road noise and pollution, offering well-designed entrances and exits to fit in with existing infrastructure, offering bathrooms and benches at pull outs, having a smooth, well-maintained path, and the presence of pullouts in case travelers need to stop. Through both free response and survey questions, it was evident that creating a facility with greenery and landscape or one that was pleasant to look at was a lower priority.

Connectivity and Accessibility
Several themes emerged from the free response questions about respondents' preferences for connectivity and accessibility. These included a preference for creating or improving bike routes, such as between San Mateo and downtown San Francisco, or from the East Bay to San Francisco, a desire to connect from bedroom communities to job centers, and providing connections to regional trail centers, public transit systems, and places that are hard to get to on a bicycle, such as shopping areas, big box stores, airports, marinas and parks. Overall, respondents

noted that a bike highway should provide a connection to both commercial and residential centers.

Environmental Justice
Through the free response section, several concerns were raised relating to environmental justice. It was noted that bike highways should not be "flyovers" for low-income communities, but should instead provide an opportunity to right historical wrongs by providing connections for communities that have previously been redlined. It was noted that access and connection to low income and disadvantaged communities should be prioritized, as should providing access to those without personal access to vehicles, and ensuring that communities of concern have ample opportunities to provide input on bike highways within their community.

Demographic Information
When possible, demographic information obtained during the survey was compared to demographics of the general population per 2019 U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates Data Profiles.

Of respondents who responded to demographic questions, the majority were ages 35-54, identified as male, identified as white, and had a combined household income of $150,000 or more.

Age

- People ages 18-34 were slightly overrepresented. 29% of respondents who provided their age group identified as 18-34 (people aged 18-34 comprise 21.7% of the nine-county Bay Area).
- People ages 35-54 were slightly overrepresented. 42% of respondents who provided their age group identified as 35-54 (people aged 35-54 comprise 27.9% of the nine-county Bay Area).
- People ages 55-74 were underrepresented. 27% of respondents who provided their age group identified as 55-74 (people aged 55-74 comprise 21.2% of the nine-county Bay Area).
- People ages 75 and above were underrepresented. 2% of respondents who provided their age group identified as 75 and above (people aged 75 and above comprise 6.3 % of the nine-county Bay Area).

Gender

- Men were overrepresented. 67% of respondents who provided their gender identified as men (men comprise 49.7% of the nine-county Bay Area) and 28% of respondents who provided their gender identified as women (women represent 50.4% of the Bay Area population).

Income

- 71% of respondents had a combined annual household income of $75,000 and were slightly overrepresented in the survey. (Those with an average combined household income of $75,000 or more represent 63.4% of the Bay Area population.)

Race/Ethnicity

- People who identify as Asian or Asian-American were underrepresented. 16% of respondents who provided their race/ethnicity identified as Asian or Asian-American (Asian or Asian-American people comprise 26.1% of the nine-county Bay Area).
- People who identify as American Indian or Alaska Native were appropriately represented. 1% of respondents who provided their race/ethnicity identified as American Indian or Alaska Native (American Indian or Alaska Native people comprise 0.2% of the nine-county Bay Area).
- People who identify as Black were significantly underrepresented. 2% of respondents who provided their race/ethnicity identified as Black (Black people comprise 5.8% of the nine-county Bay Area).
- People of Hispanic, Latino or Spanish origin, who make up 23.5% of the nine-county Bay Area, were underrepresented at 8%.
- People who identify as Native Hawaiian or other Pacific Islander were appropriately represented. 1% of respondents who provided their race/ethnicity identified as Native Hawaiian or other Pacific Islander (Native Hawaiian or other Pacific Islander people comprise 0.6% of the nine-county Bay Area).
- People who identify as non-Hispanic White were overrepresented. 71% of respondents who provided their race/ethnicity identified as non-Hispanic white (non-Hispanic White people comprise 39.3% of the nine-county Bay Area).

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MEMORANDUM

TO: Elliot Goodrich, Project Manager, Associate Transportation Planner, Caltrans Bay Area

CC: Sergio Ruiz, Complete Streets Coordinator, Caltrans Bay Area
Greg Currey, Active Transportation Branch Chief, Caltrans Bay Area

FROM: Mauricio Hernández, Alta Planning + Design
Maurits Lopes Cardozo, Bike-minded

DATE: February 1, 2021

RE: Caltrans Bay Area – Bike Highways Best Practices Review

The Alta Planning + Design Project Team performed a review of bike highway implementation best practices as part of the Caltrans Bay Area Bike Highway Study. This memo summarizes the Project Team's initial review of bicycle highway best practices.

Bike Highway in Denmark. Photo Courtesy Maurits Lopez Cardozo

A number of international facility design guidelines were consulted to inventory best practices for the implementation of these facilities including the Cycle Highway Manual, *Supercykelstier* (Denmark); Dutch CROW Manual and Danish Collection of Cycling Concepts; Cycle Infrastructure Design manual (UK) and the *Guía de ciclo-infraestructura para ciudades colombianas* (Colombia).

Various national bicycle and pedestrian design manuals were also consulted and included the Manual on Uniform Traffic Control Devices (MUTCD); the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (2012); The ADA Accessibility Guidelines (ADAAG); the National Association of City Transportation Officials' (NACTO) Urban Bikeway Design Guide; the California Highway Design Manual; Caltrans Design Information Bulletin 89-01; Caltrans Design Information Bulletin 82-06; and Caltrans Bikeway Facility Selection Guidance.

In addition, six existing Bicycle Highways from leading cycling cities in Asia, Europe, Latin America were evaluated based on their land-use context, level of separation, connectivity to destinations, and safety treatments at intersections.

The document is organized into four sections. A summary of key findings is also included following this introduction.

Section 1 provides background information on bicycle highway implementation including a preliminary definition of what constitutes a bicycle highway, potential users, and how they operate around the world.

Sections 2 and **3** present best practices for route selection and design features, respectively.

Section 4 presents case studies from jurisdictions around the world that have implemented bicycle highways.

Main Findings

What are Bike Highways?

The definition of a Bike Highway (BH) varies throughout the world. However, BHs share a common goal—to connect users to key destinations by means of a high-quality, uninterrupted, and long-distance bikeway. These facilities are designed to support large volumes of people bicycling, whether they are everyday commuters or recreational users. BHs typically range from 3-20 miles in length and often connect regional destinations, such as transit hubs or job centers, and cities. By providing an attractive, direct, comfortable and safe link to destinations, while creating an environment specifically for people who bike, BHs incentivize alternative modes of transportation to driving.

Bike Highways are unique from other biking facilities/routes, because they generally serve as a fully-separated backbone to larger regional bicycle networks. In addition to generally providing separation from vehicular traffic and a space designed exclusively for people biking, they feature superior surface quality, consistent lighting and wayfinding/signage. BHs also mitigate intersections that require stop-and-go by prioritizing grade separation and giving users the right-of-way when there are in mixed zones with cars. Lastly, existing BHs in Europe, Asia, and South America are unique in that they are not explicitly designed for all ages and abilities; at times however, they route through on-street facilities to prioritize the more utilitarian purpose of getting bicycle users from point A to point B efficiently and quickly. This is a notable difference to the Class I / Shared Use Paths in the United States that have been designed to support both people walking and riding bicycles, two user groups with different needs and design criteria.

People biking along a bike highway in Amsterdam. Photo courtesy The Homage Project.

Key Features of Bicycle Highways

The following features guide the implementation of BH. They have been organized alphabetically.

Attractive

Bike Highways provide a positive alternative to driving. In order to encourage modal shifts, they must create an attractive user experience through ease of use, safety, convenience, and design features. Clear separation between users on the route (by mode type or by speed), good lighting, and high-quality surfaces, create a comfortable user experience.

Dedicated

Bike Highways provide a safe alternative to heavily-trafficked shared modal corridors. A combination of separated facilities, grade-separated crossings, motor vehicle diversions, and crossing improvements contribute to a safe user experience.

Direct

Bike Highways provide a direct connection between major destinations such as places of employment, commercial centers, and residential areas. By minimizing circuitous routes, BHs enable users to reach their destinations quickly.

Low Effort

Bike Highways provide an efficient travel experience for people riding bicycles with limited interruptions and low grades.

Mobility

Bike Highways provide fast mobility for users. They must also connect to local bikeways in order to allow as many users as possible to access the facility. Integration with the existing bike network maximizes the number of people who can safely and comfortably reach and use the BH.

A fully separated bicycle facility in the Hague. Photo courtesy The Homage Project.

Bicycle Highways are Designed for Comfort and Safety

Bike Highways feature unique design elements. From the width, slope, and surface materials of the path to the clear delineation between different types of users, routes must include the following design features in order to reach the key features listed above.

Alignment

Optimal BH routes have wide travel paths that designate separate lanes for users moving at different speeds. This allows for positive interactions between people bicycling, regardless of ability or intended use (e.g., slower recreational users and people on e-bikes commuting longer distances can both use the pathway without interfering with one another). BHs around the world are designed to allow for faster users to safely overtake slower users, as well as for comfortable side-by-side riding along the route. The two existing bikeway classifications in California that provide for dedicated space with physical separation from motor traffic are Class I bike paths and Class IV separated bikeways.

Intersections

To create efficient, low effort routes and mitigate slowdowns and complete stops, BHs feature intersection treatments such as grade-separated crossings, limited through-traffic on streets where modal mixing is required, bicycle detection at signalized crossings, and priority given to people biking. In addition, corridor-length signal timing coordination, or green wave signal timing, can improve bike flow along BHs. To prioritize bicycle travel along the route, signalized intersections can be coordinated to provide consecutive green lights for people bicycling at moderate speeds. In practice, this mitigates red lights at intersection crossings for BH routes and allows for fewer stops and slowdowns.

Materials and Amenities

One of the best mechanisms for designating a BH is the surface treatment of the pathway; vibrant pavement colors in addition to well-lit spaces and intersections along the route contribute to a comfortable user experience and create a sense of place. Additionally, high-quality surface treatments require less effort to ride on and create an overall more positive and comfortable experience. Wayfinding and branding efforts enable users to successfully navigate the facility, while amenities such as benches, viewing points, and bike parking provide a more enjoyable experience.

Section 1: Bike Highways Background

What is a Bike Highway?

A Bike Highway is a high-quality, uninterrupted, long-distance bikeway that includes separation (vertical and horizontal where appropriate) from motor vehicles. These thoroughfares are intended to accommodate high volumes of people travelling longer distances on bicycles (3+ miles) by connecting users to important destinations. BHs connect large working districts to major neighborhoods, suburbs, and other cities within a comfortable cycling distance (up to 10-20 miles). They also often encourage a modal shift from car to bicycle by providing an alternative to congested motor vehicle corridors. When riding on a BH, users can achieve higher average speeds and a more comfortable and positive experience compared to on-street or other biking routes.

Ideally, BHs feature superior surface quality (i.e., smooth pavement), high-quality lighting along the route, and enhanced roadway crossings or grade separation. These features allow for fewer interruptions along the route as well as fast and comfortable bicycle travel between regional destinations. BHs are designed to be a direct, attractive, safe, and comfortable bicycle route that connects to all relevant destinations with minimal detours.

Bike Highways can be an effective, cost-efficient and low-emission solution for daily trips to work and/or school. However, they do not represent a one-size-fits-all solution for all regional and local mobility problems. BHs work best when they are supported by other local and regional bikeways and facilities.

Bike highways offer an alternative to driving. Photo courtesy The Homage Project.

History

The following chart summarizes the history of BH trends throughout the world.

1885	First dedicated bicycle path in **Utrecht, Netherlands** along the Maliebaan (urban context).
1887	Opening of **Pasadena, CA** cycle-way; first separated (and elevated) bicycle path in the United States.
1899	First dedicated intercity bicycle paths in the **Netherlands** between the cities of **Breda and Tilburg** (paved bicycle paths along a cobblestone road).
1977	Opening of first demonstration project in **Tilburg, Netherlands** of retrofitting high quality bicycle routes along car dominated streets. A 100% nationally funded pilot project for "well designed urban cycling infrastructure" route.
2004	Opening of first "bicycle highway" in the **Netherlands** connecting the city center of Breda to the town of Etten-Leur.
2006	Launch of Dutch nationally funded program "Fiets filevrij!" ("Cycling without congestion!") to fight congestion on motorways. The goal was to stimulate people who commuted by car living at cycling distance (< 9 miles) to cycle to their work. This resulted in initially five comfortable and fast cycling routes along congested corridors: **Apeldoorn-Deventer, Zoetermeer-Den Haag, Delft-Rotterdam, Zaandam-Amsterdam, Breukelen-Utrecht**
2010	Opening of first Cycling Highways in **London** (CS3 and CS7); these were 1st generation Cycling Highways (mostly bike lanes painted blue)
2012	Opening of first Danish bicycle Highway C99 Copenhagen-Alvertslund (10.5 miles long) in **Copenhagen.**

Lengths

Bike Highways typically range from 3-20 miles in length. In some cases, they can be longer to help provide uninterrupted connectivity between large regional destinations and cities. Typically, BHs connect city centers and surrounding suburbs/towns to facilitate commute by bike. In many European contexts, the maximum daily cycling distance is estimated to be around 19 miles for people bicycling to work, but the average may be around seven miles. This distance can increase for e-bikes users who are often more willing to cover long distances. The proper length of a BH depends on the surrounding environment as well as the spatial distribution of destinations and work centers that it seeks to connect.

Terminology Around the World

No single term is used around the world to describe BHs. However, transportation professionals generally recommend using the term "highway" more sporadically to avoid any pushback and opposition to the project from local communities. A number of transportation professionals and experts working on BHs throughout the world have noted that the use of terms like "highway" and "fast" can have negative connotations. These terms tend to emphasize a higher relative speed than the facilities are designed for. Concerns by local residents surrounding BHs include fear that people biking at high speeds will create unsafe environments for people walking near the facility.

Table 1 below provides a summary of terms used in selected countries and the United States to describe BHs.

Table 1. Bicycle highways terminology used around the world

Country	Terminology
Belgium	• Fiets-o-strade [Bicycle highway/road] • Fietsostrade [Bicycle highway] • Velostrade [Bike road]
Bogotá, Colombia	• Ciclorrutas de Bogotá [Cycling routes of Bogotá]
Copenhagen, Denmark	• Supercykelstier [Super bike trail]
Germany	• Radschnellwege [Cycle superhighways] • Radschnellverbindungen [Bicycle quick connections]
Netherlands	• Snelfietsroute [fast cycling route] • Doorfietsroute [keep going route] • Fietssnelweg [bicycle highway]
Switzerland	• Velobahn [bike highway]
London, United Kingdom	• Cycleways (Two formerly separate networks 'Cycle Highways' and 'Quietways' are no longer used by TfL and consolidated to one network type 'Cycleways')
United States	• Bicycle highway • Bicycle superhighway • Bike freeway • Cycling highway • Fast cycle route • Super bikeway

Existing Guidance

The design guidelines below were consulted to inventory best practices for the implementation of Bicycle Highways and provide conceptual guidance for their development. The treatments and design guidelines are important because they are the tools for creating a safe and outstanding user experience for people bicycling. The guidelines set the framework for the path design to achieve the project goals.

- Cycle Highway Manual - summarizes over three years of knowledge sharing and research between partners from Belgium, the Netherlands, Germany, UK and Denmark on the development of Bicycle Highways.

- *Supercykelstier* summarizes the design guidelines for the development of bicycle highways in the Danish Capital Region. Denmark and its capital region. To

- Dutch CROW Manual and Danish Collection of Cycling Concepts provides further international best practice and design direction for on-street and off-street bicycle facilities, including transitions, shared spaces, gradients, wayfinding, and other elements.

- Cycle Infrastructure Design (United Kingdom). The document provides guidance on the development of high quality, bicycle infrastructure focusing on topics including planning for bicycle infrastructure, development of facilities within highway rights of way (ROW), development of Class I-IV facilities; intersection improvements and considerations; wayfinding and markings; and, construction and maintenance.

- *Guía de ciclo-infraestructura para ciudades colombianas* (Colombia). This first of its kind guide presents design recommendations for the development of comfortable and safe bicycle infrastructure in Colombia. The guide provides a full account of design standards for the urban/suburban context in Colombia; provide decision-making tools for implementing the most appropriate bicycle facility for each user type, present strategies to promote the implementation of facilities and support the process of improving the technical capacity of Colombian jurisdictions.

While all national guidelines do not specifically call out BHs as a facility, the design practices included in the manuals can be applied to the development of BHs. The following US design manuals focusing on the development and implementation of bicycle and pedestrian facilities were consulted:

- The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) was amended by Caltrans for use in California. The CA MUTCD provides uniform standards and specifications for all official traffic control devices in California.

- The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (2012) is currently under update with a new and expanded edition due out in 2020-2021, but still serves as one of the main resources of design guidance. The guide documents best practice for on-street and off-street (path) facilities, as it relates to the operational and safety characteristics of different facility user types.

- The ADA Accessibility Guidelines (ADAAG) are design guidelines developed and updated by United States Access Board, an independent federal agency, created in 1973 to ensure access to federally funded facilities. The U.S. Department of Justice (DOJ) and U.S. Department of Transportation (DOT) each have similar ADA Standards based on the ADAAG. The DOJ's standards apply to all facilities except public transportation facilities, which are subject to DOT's ADA standards.

- The United States Access Board is developing guidelines for public rights of way, referred to as Public Rights-of-Way Accessibility Guidelines (PROWAG). Once these guidelines are adopted by the DOJ, they will become enforceable standards under title II of the ADA. The Board's aim is to ensure that access for persons with disabilities is provided wherever a pedestrian way is newly built or altered, and that the same degree of convenience, connection, and safety afforded to the public generally is available to pedestrians with disabilities.

- The National Association of City Transportation Officials' (NACTO) Urban Bikeway Design Guide (2012) is the newest publication of nationally recognized bikeway design standards, and offers guidance on current state-of-the-practice designs for on-street bicycle facilities.

As with national bikeway guidelines, there is no specific guidance for bike highway facilities within the State of California. However, the development and implementation of bicycle and pedestrian facilities within State of California right-of-way are subject to the guidance of the following documents.

- The California Highway Design Manual (HDM) establishes uniform policies and procedures to carry out the state highway design functions of the California Department of Transportation. Most relevant to the design of bike highway facilities is Chapter 1000, which provides design guidance for Class I bikeways (bike paths), Class III bikeways (bike routes), and Trails, however additional guidance is located in other chapters.

- Caltrans Design Information Bulletin (DIB) 89-01 provides guidance specific to Class IV Bikeways in response to the Protected Bikeways Act of 2014. The DIB outlines design criteria and other general guidance on best practices related to separated bikeways to establish uniform guidance for the use of owners of these facilities.

- Caltrans DIB 82-06 provides guidance on pedestrian accessibility for highway projects. The DIB provides general design guidance on how to comply with the various Federal laws and State codes on pedestrian accessibility for public use, including the 2010 ADA Standards, PROWAG, and Title 24.

- The Caltrans Bikeway Facility Selection Guidance provides supplemental guidance on the evaluation and selection of bikeway facility type using the Federal Highway Administration's Bikeway Selection Guide. The memorandum provides supplemental information to existing Caltrans guidance and standards, including descriptions and characteristics of bikeway facility classifications.

The recently completed Richmond-San Rafael Bridge Path provides uninterrupted links between Marin and Contra Costa Counties along I-580. Photo courtesy Sergio Ruiz.

Intended Users

Bike Highways best serve bicycle commuters, as they provide safe and attractive spaces for long-distance biking as an alternative to driving. Although designated BHs around the world are generally focused on providing higher speed bicycling and not necessarily designed to accommodate users of all ages and abilities, optimal BH routes allow for users of different speeds to comfortably pass one another or have separation along the path.[1] BHs also accommodate different types of bicycles including cargo bikes, recumbent bikes and e-bikes. Other users of BHs include:

- People bicycling recreationally
- People bicycling for sport (race and MTB)
- Other mobility devices (ex. scooters, skates, skateboard, etc.)
- Cycle logistics – delivery / bike messenger

In recent years, a rise in the use of e-bikes has been documented throughout a number of BHs. These bicycles provide an additional boost for people biking by reducing the amount of energy needed to travel by bike, thus making longer bike rides more accessible. In recent years, the use of e-bikes and other powered mobility devices such as electric scooters has been considered in the implementation of BHs. BH design has also begun considering the provision of safe infrastructure and features that enable uninterrupted speeds for these faster mobility devices. In California, e-bikes are regulated with a maximum motor-assisted speed of 20 or 28 miles per hour, depending on the facility type and jurisdiction.

Collaboration Across Jurisdictions

In most cases, as longer distance facilities BHs cross multiple jurisdictions. Collaboration between different transportation authorities as well as local municipalities is crucial to the successful implementation of BHs. Collaboration also leads to the identification of the most direct bike route between jurisdictions, a consensus on high quality infrastructure, grade separation where needed, and streamlining of acquisition of land/right-of-way. Most international BH networks typically include one regional authority (ex. regional transportation authority, MPO, state government, provincial or national transportation authority) that takes the lead in coordinating the development for a new BH.

Bike highway in Granada, Spain was implemented in collaboration between the Mobility department and the Planning department as part of the Ayuntamiento de Granada

Collaboration across jurisdictions also provides substantial opportunities to provide synergies between projects. Combining transportation goals and projects across different authorities and organizations can open up opportunities for shared benefits, efficiencies between major infrastructural projects (ex. highway/rail/etc.), and active mobility improvements to reach overarching mobility/health/livability goals.

[1] European Cycle Highway Manual.

Section 2: Route Selection Best Practices

Prior to designing a BH, it is important to develop goals for the project and an optimal route alignment. To this end, the following issues should be considered. Table 2 provides an overview of these requirements with a brief description and relation to BHs.

Key Features

The following section has been developed using the Dutch design guidelines. These guidelines use five universal criteria for planning and design of cycling routes, including bike highways. They have been organized alphabetically.

Attractive

Bike Highways provide a positive alternative to driving. In order to encourage modal shifts, they must create an attractive user experience through ease of use, safety, convenience, and design features. Clear separation between users on the route (by mode type or by speed), good lighting, and high-quality surfaces, create a comfortable user experience.

Dedicated

Bike Highways provide a safe alternative to heavily-trafficked shared modal corridors. A combination of separated facilities, grade-separated crossings, motor vehicle diversions, and crossing improvements contribute to a safe user experience.

Direct

Bike Highways provide a direct connection between major destinations such as places of employment, commercial centers, and residential areas. By minimizing circuitous routes, BHs enable users to reach their destinations quickly.

Low Effort

Bike Highways provide an efficient travel experience for people riding bicycles with limited interruptions and low grades.

Mobility

Bike Highways provide fast mobility for users. They must also connect to local bikeways to allow as many users as possible to access the facility. Integration with the existing bike network maximizes the facility's catchment area.

Table 2: Bicycle highway and cycling network key features (Based on general design criteria for bicycle routes as described in the Dutch Design Manual for Bicycle Traffic)

Principles	Description	How it informs Alignment Development
Attractive	Positive and safe user experience; high quality materials and amenities	• Minimize isolated sections or trail with poor perceived safety
Dedicated	Separated from vehicular Traffic	• Accommodate continuous separated or elevated bicycle facility (ex. Cycle track, side path, trail)
Direct	Connect key destinations with few detours and stops	• Minimize overall length • Minimize intersections or provide grade separated intersections
Low Effort	Limited interruptions and low grades	• Bikeway signal timing (i.e., green wave) • Minimize grade change and steep slopes
Mobility	Fast mobility for users. Backbone of regional bicycle network	• Fast movement of users • Provide consistently spaced access points to bikeway • Provide connections between local bikeways (both existing and proposed)

Section 3: Design Elements

Bike Highway elements seek to meet the needs of users and to attract them by creating a safe and comfortable user experience. The following list of design features, are summarized below and should be considered for BH development. They have been organized in three main categories: Alignment, Intersections, and Materials and Amenities

Alignment

Optimal BH routes have wide travel paths that designate separate lanes for users moving at different speeds. This allows for positive interactions between people bicycling, regardless of ability or intended use (e.g., slower recreational users and people on e-bikes commuting longer distances can both use the pathway without interfering with one another). BHs around the world are designed to allow for faster users to safely overtake slower users, as well as for comfortable side-by-side riding along the route. The two existing bikeway classifications in California that provide for dedicated space with physical separation from motor traffic are Class I bike paths and Class IV separated bikeways.

Level of Separation

Two levels of separation are important to successful BHs; design plays a key role in enabling these goals:

1. Separation of users from other modes such as motor vehicles and pedestrians along the route
2. Separation of users from each other when traveling on the facility

The most ideal BH is completely isolated from other modes of transportation. In instances where dedicated ROW may not be available, BHs can be mixed with automobiles through on-street bicycle facilities, as European examples show. While a high level of separation is preferred due to the added comfort and general attractiveness for people "interested in but concerned about" bicycling, spacing constraints in existing urban or rural environments often require some mixing of people bicycling and driving. However, mixing of modes should only occur in constrained areas. Figure 1 below outlines varying degrees of separation, from fully-separated to shared bike, car, and transit typologies.

The degree of separation between modes in a BH corridor is dependent on:

- Available width of the corridor – is there enough ROW to provide for additional separation between modes?
- Intersection density and visibility of people bicycling at intersections – will the person biking have to cross a high number of intersections to arrive to their final destination? Do the intersections provide enough visibility of and for people biking across?
- Volume of people travelling on foot – is there any walking traffic expected to be in the bicycle path?

When the availability of ROW is limited, mixing BH users with motor vehicles on a street is acceptable only along those corridors with low speeds and low volumes of car traffic (i.e., streets with travel speeds at 25 mph or less and with traffic volumes of fewer than 1,500 vehicles per day). Further, when separation between modes is not possible (for instance, at intersections or space constrained urban corridors), it is important that the design of the BH and its features help 1) reduce speeds of all traffic and, 2) ensure good visibility of all modes, so all users can travel safely along the corridor.

User separation along BHs promotes increased comfort levels and perceived safety. Design features to accomplish this may include separated lanes for fast users, wide travel paths to allow users to self-regulate, or separate facilities for people walking. Figure 2 illustrates potential BH typologies.

Figure 1: Separation of Modes.

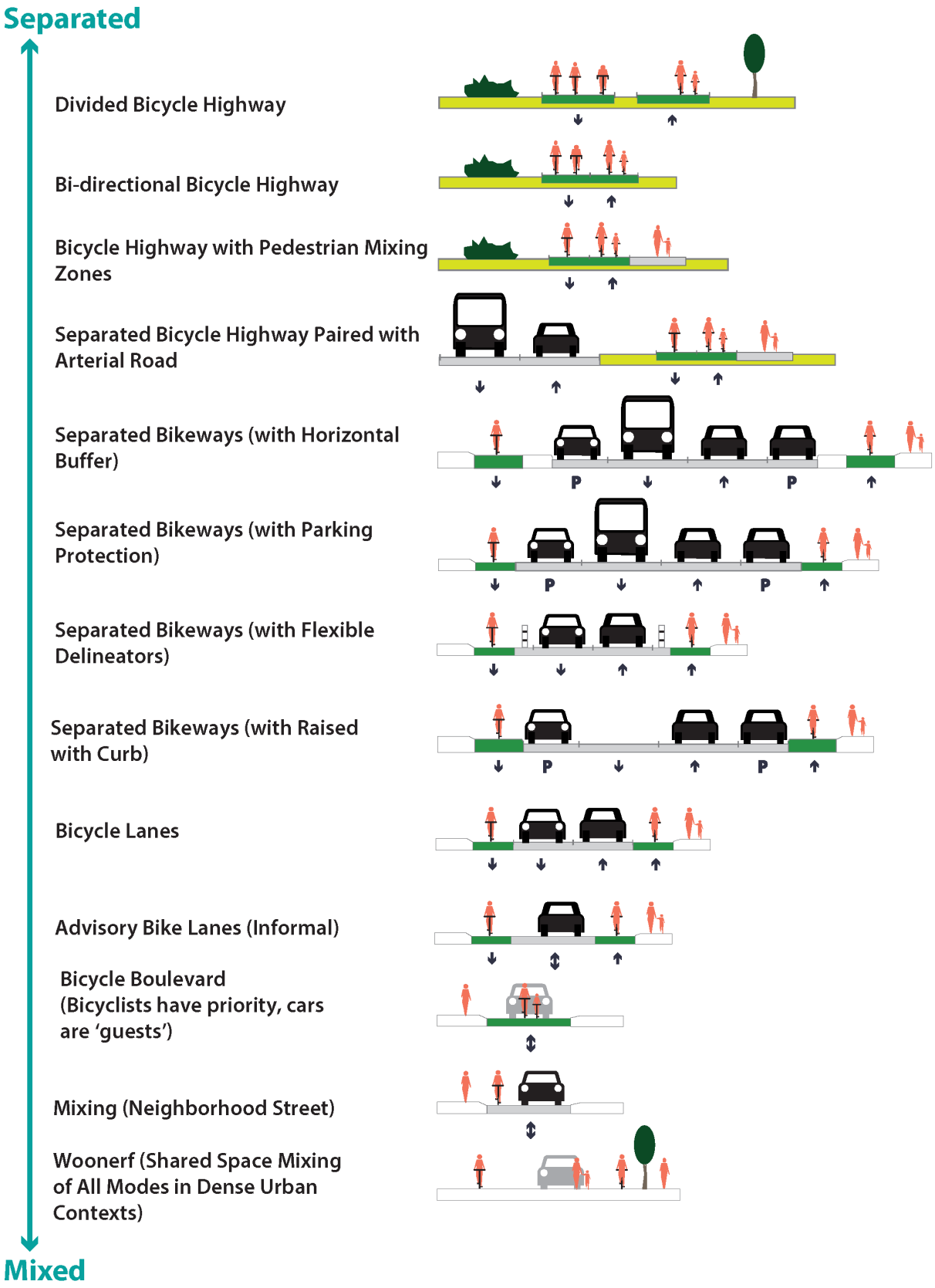
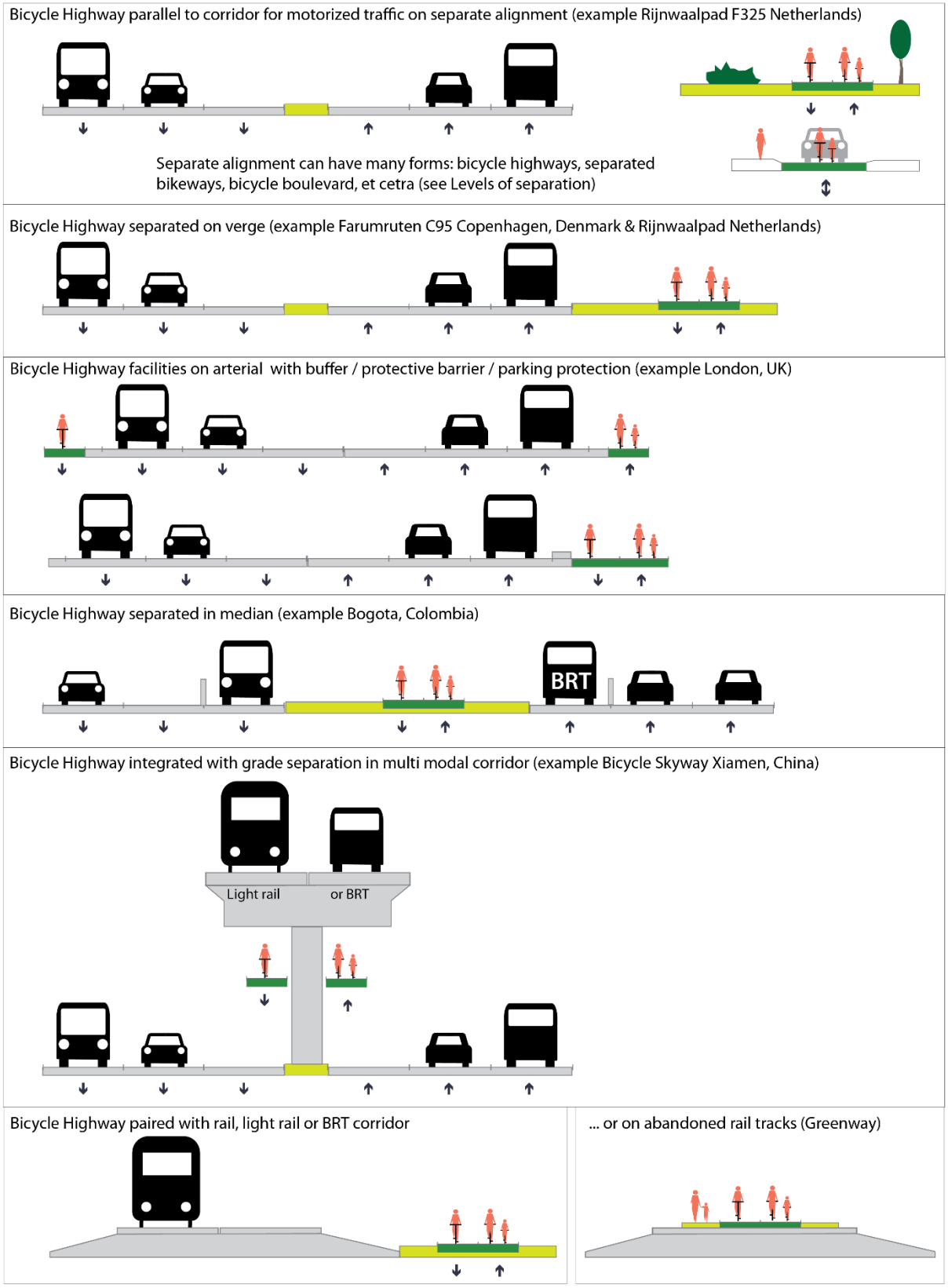


Figure 2: Bike Highway Typologies in relation to main motorized traffic and public transportation corridors.



Design Speeds

Design speed defines the geometric requirements for a bike route to accommodate users to ride continuously at a certain speed without endangering their safety and of other users. A high design speed enables shorter travel times and make a BH more competitive and potentially successful.

Typically, the design speed in most (European) guidelines is 18.6 mph (30 kph). The minimum design speed in any case is noted at 7.5 mph (12 kph) because of the effort it takes to balance on a bicycle under that speed. Slower design speeds are not ideal for BHs as tighter radius turns can limit the efficiency of the facility. These guidelines also consider changes in topography (i.e., steeper slope) and the increased popularity of e-bikes which allow the user to go faster on a bicycle. In these instances, most guidelines consider a design speed of up to 28 mph (45 kph).

Two geometric requirements are closely related to design speed:

- Horizontal curve radius - a tight curve forces a person bicycling to slow down
- Sight distance - enable enough visibility to allow a person bicycling to assess the situation and adjust speed or stop if needed

Table 3 provides a summary of design speeds and geometric requirements for Bicycle Highways.

Table 3: Design speed geometric requirements[2]

	Design Speed	Horizontal Curve Radius	Sight Distance
Desired	18.6 mph	65.6 ft	246 ft
Average	15.5 mph	65.6 ft	229 ft

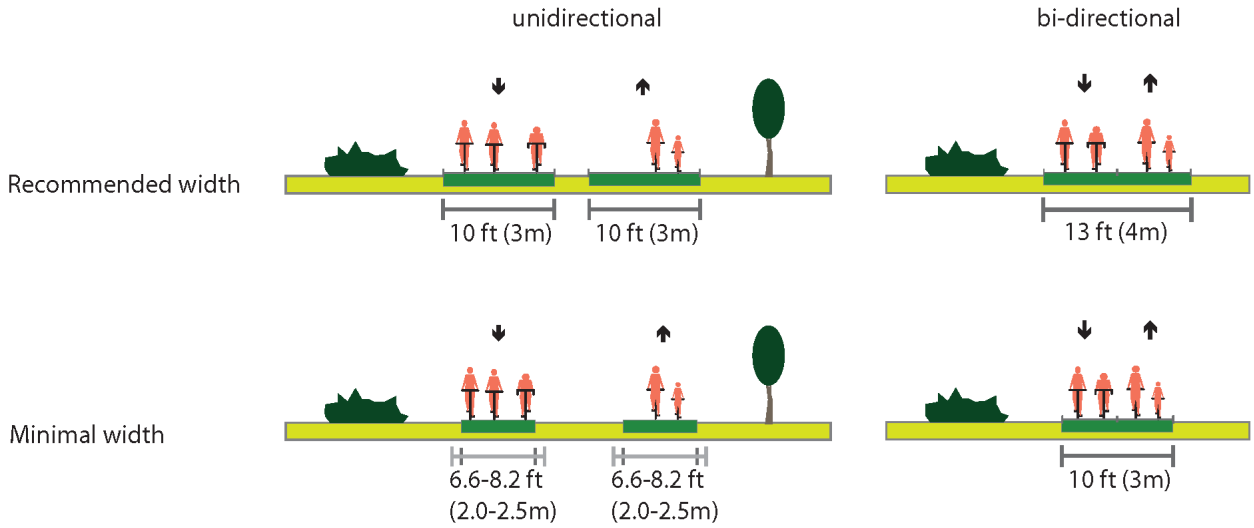
Width

Bike Highways in the European context comfortably accommodate people with different levels of fitness and skill, as well as different types of bicycles (e.g., mountain bike, cargo bike, etc.). Bike Highway widths allow for faster moving users to safely overtake slower ones on the pathway. Finally, to allow for users to be social and talk to each other, pathway widths allow for side-by-side riding for most of the route.

Most existing guidelines in Europe recommend a width of 13.12 ft (4.0 m) for a bi-directional cycle path, and 8.2-10 ft. (2.5-3.0 m) for unidirectional cycle paths. Minimum widths allowed are 10 ft (3.0 m) for a bi-directional path and 6.5-8.2 ft. (2.0-2.5 m). These widths are shown below in Figure 3.

[2] Cycle Highway Manual

Figure 3: Bike Highway width based on European design guidelines. Figure courtesy Bike-minded.



A person passing two people chatting side-by-side along Wilhelm's Harbour, Germany. Photo courtesy Maurits Lopes Cardozo.

Slope

The Dutch Design Manual for Bicycle Traffic (CROW)[3] offers comprehensive requirements for bicycle slopes:

- Generally, for a higher height difference, a less steep gradient is applied, as people bicycling lose their initial momentum during the climb (assuming a horizontal approach).
- For short climbs (<6 ft) the gradient for people bicycling does not exceed 6%, although very short sections with up to 10% might be acceptable.
- For longer ascends (>12 ft) gradients are reduced to 2 to 3%

The design of the bicycle facility also considers increasing the width of the pathway on descending slopes, as people bicycling appreciate a wider safety margins because of the higher speed. This tends to improve safety and comfort for those climbing more slowly than others. It is also important to prevent any tight curves or crossings where priority is not given to people bicycling on or near the slope, to avoid potential safety hazards and unwanted braking.

In the United States, pathway projects that accommodate multiple modes (i.e., people walking and/or biking), must comply with standards set forth by the Americans with Disabilities Act (ADA). ADA provisions that pedestrian walkways shall not exceed 8.33% (1:12 ratio) running slope for 30 feet without a level landing and handrails. Any pedestrian walkway above 5% slope (1:20 ratio) is to be considered a ramp.[4] Facilities that accommodate only bicycles are subject to PROWAG and AASHTO standards which allow for steeper slopes.[5]

Four percent slope with intermediate horizontal section helps users on N242 highway, Heerhugowaard, Netherlands. Photo courtesy Maurits Lopes Cardozo.

[3] Dutch Design Manual for Bicycle Traffic (CROW)
[4] Americans with Disabilities Act (ADA). Section 4.8 Ramps.
[5] Association of State Highway and Transportation Officials (AASHTO) Bike Guide. Chapter 4-65.

Vehicles Permitted

Motor vehicles are not typically allowed to use BHs and associated routes as they represent safety barriers for people bicycling and can block the flow of users on the facility. Maintenance and emergency vehicles, however, are permitted for incidental use. Path cross sections should be designed to accommodate these loads. As previously noted, there are BH typologies that allow for the mix of people bicycling and driving depending on the local context, traffic volumes, and speeds.

Intersections

To create efficient, low effort routes and mitigate slowdowns and complete stops, BHs feature intersection treatments such as grade-separated crossings, limited through-traffic on streets where modal mixing is required, bicycle detection at signalized crossings, and priority given to people biking. In addition, corridor-length signal timing coordination, or green wave signal timing, can improve bike flow along BHs. To prioritize bicycle travel along the route, signalized intersections can be coordinated to provide consecutive green lights for people bicycling at moderate speeds. In practice, this mitigates red lights at intersection crossings for BH routes and allows for fewer stops and slowdowns.

Access Points and Connections to Local Bikeway

Bike Highways seek to serve as the backbone of regional bicycle networks with a clear start and end. Users are likely to have origins and destinations spread over a larger area, possibly only using part of the BH. Therefore, intermediate connectivity with neighborhoods and important destinations along the route is essential. Access points along the route and clear, easy-to-navigate connections to surrounding bikeways are key design considerations.

Intersection/ Crossing Treatments

Design efforts at intersections and crossings are especially important for a successful BH. Significant slowdowns and complete stops along the route can negatively impact the user experience as they increase travel time and the amount of energy it takes for users to restart their ride.

Grade separated bicycle crossing, Emmen, Netherlands. Photo courtesy Maurits Lopes Cardozo.

The following strategies can be used to minimize interruptions:

- Limit the number of conflict points with motor vehicles and remove crossings with cars where possible. For example, closing a neighborhood street to through traffic can in some cases eliminate an otherwise hazardous crossing.
- Provide for the implementation of grade-separated crossings (i.e., bridges and underpasses) which enable uninterrupted travel for both people bicycling and people driving. These are dependent on availability of space and funding.
- Prioritize people biking at crossings. Unsignalized intersections where BH users have priority can provide safe crossings when the speed of motor vehicles is reduced (<20mph) and when car drivers have clear visibility of people approaching on bicycles.
- Prioritize bicycle signals at large intersections. Signalized crossings can provide a safe crossing, but usually have a negative effect on travel time. Without signal improvements for people biking, they are generally not preferred for BHs, but could be necessary at mixed-use intersections with existing infrastructure.

At-grade signalized bicycle crossing, Rotterdam, Netherlands. Photo courtesy Maurits Lopes Cardozo.

Green Wave Signal Phasing

System-wide signal timing coordination can improve traffic flow for high-volume corridors and across a street grid. Because of the speed differential between motor vehicles and bicycles, people bicycling often encounter more red lights compared to people driving, and as a result spend more time waiting at red lights and exert greater energy to resume traveling speed. Some cities have applied this corridor-level signal timing coordination concept to prioritize bicycle travel. The “green-wave” coordinates signals along a corridor to provide consecutive green lights for vehicles traveling at a moderate bicycling speed, usually around 12-13 miles per hour, rather than motor vehicle speeds. The “green-wave” can be applied in the BH context in order to limit stops at intersections.

Materials and Amenities

One of the best mechanisms for designating a BH is the surface treatment of the pathway; vibrant pavement colors in addition to well-lit spaces and intersections along the route contribute to a comfortable user experience and create a sense of place. Wayfinding and branding efforts enable users to successfully navigate the facility, while amenities such as benches, viewing points, and bike parking provide a more comfortable experience.

Surface Materials

Surface quality and the materials used along a BH affect the comfort and energy expenditure of people bicycling. Uneven surfaces and poor roadway friction can increase the collision risk and the probability of a person bicycling to lose control of their bicycle. As most bicycles tend to have narrow tires, they are more susceptible to bad surfaces and potholes. While most BHs throughout the world use either asphalt or concrete to provide a smooth and comfortable surface, a number of colors are used around the world to denote the presence of bicycle facilities including BHs including blue (England and Colombia), red (Denmark and Colombia), and green (United States).

Branding/Wayfinding

Strong visual identity and branding can help the promotion and implementation of a BH. Uniform branding of the route improves "discoverability" of the BH by informing the general public about the existence of the bikeway and helping attract potential new path users. Wayfinding and its branding elements help path users recognize and navigate along the bikeway. According to European Cycleways manual, "The wayfinding infrastructure needs a clear brand that helps potential users to differentiate the [Highway] from other competing products in the mobility market."[6] It is also important that wayfinding, branding, and colors present a unified identity and directionality, particularly at inflection points and crossings with other bicycle facilities.

Figure 4: Branding and wayfinding examples along European Bicycle Highways. Photos courtesy Maurits Lopes Cardozo

[6] Cycle Highway Manual. Cycle Highways Innovation for Smarter People Transport and Spatial Planning. Accessed from https://cyclehighways.eu/ on October 22, 2020

Lighting

The provision of appropriate lighting along a BH is important for the following reasons:

- Lighting can help users navigate in the dark, and recognize and maneuver through curves, tight crossings and obstacles; it can also help users identify existing wayfinding.
- Lighting helps improve safety through increased visibility, especially at crossings or junctions and sections with mixed traffic. In mixing zones with people walking, it provides enough visibility for people walking as well as people bicycling.
- Lighting can ease transitions from darker facilities (e.g., tunnels) to the bright daylight.
- Lighting can improve perceived safety by illuminating the pathway, other users, and the path's surroundings.

For reference, the Dutch design guidelines state a minimum illuminance of 7 lux. Please note that providing lighting along the path can have an undesired "light tunnel" effect, where the surroundings may seem darker to a person bicycling who is traveling along the illuminated corridor. It is advisable to work with lighting specialists to determine the minimum required lighting levels. Besides path illumination, it is important that all people bicycling use bicycle lights when it is dark so they will be seen by other modes.

Support Facilities

There are many types of supporting facilities along BHs. Some are as simple as well-placed bike parking or a footrest at a traffic light. Some are more elaborate, including full-service bicycle repair and maintenance shops. Service points/hubs can assist with the following goals:

- To promote the route and attract new and existing users
- To offer bicycle-oriented services, such as DIY repair, air pump, bicycle lockers, etc.
- To provide additional services for convenience, such as information, shelter, package pick-up and drop-off points, etc.

The best approach to understanding what support facilities are needed is to request feedback from the community that a potential service point/hub may serve.

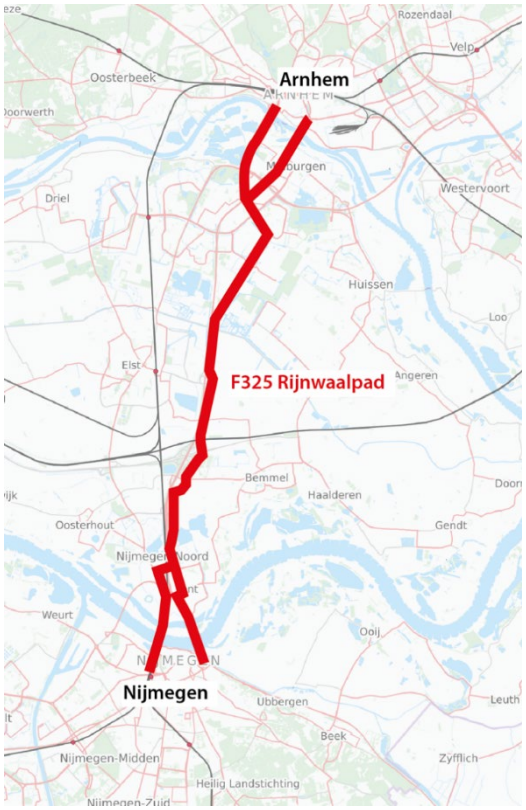
Section 4: Case Studies

This section provides BH case studies from leading cycling cities in Europe, Latin America, Asia and the United States. Each example was selected based on its land-use context, level of separation, connectivity to destinations, and safety treatments at intersections. Each case study provides an overview of the bicycle route, a global geographical route map, and several images to illustrate the character of the pathway. The following case studies were reviewed:

1. RijnWaalpad F325 Arnhem-Nijmegen, Netherlands: Inter-city bicycle highway
2. Slowlane Eindhoven, Netherlands: Regional bicycle highway ring road
3. Farumruten C95 Copenhagen, Denmark: Rural to urban bicycle highway
4. East-West Cycle Highway (CS3) London, United Kingdom: Urban backbone bicycle highway
5. Ciclorruta de la Calle 26, Avenida El Dorado Bogotá, Colombia: Bicycle highway with BRT in median of corridor
6. Bicycle Skyway, Xiamen, China: Fully grade-separated (elevated) bicycle highway

All photos are courtesy Maurits Lopes Cardozo, unless otherwise noted.

Case Study #1: RijnWaalpad Arnhem-Mijmegen, Netherlands

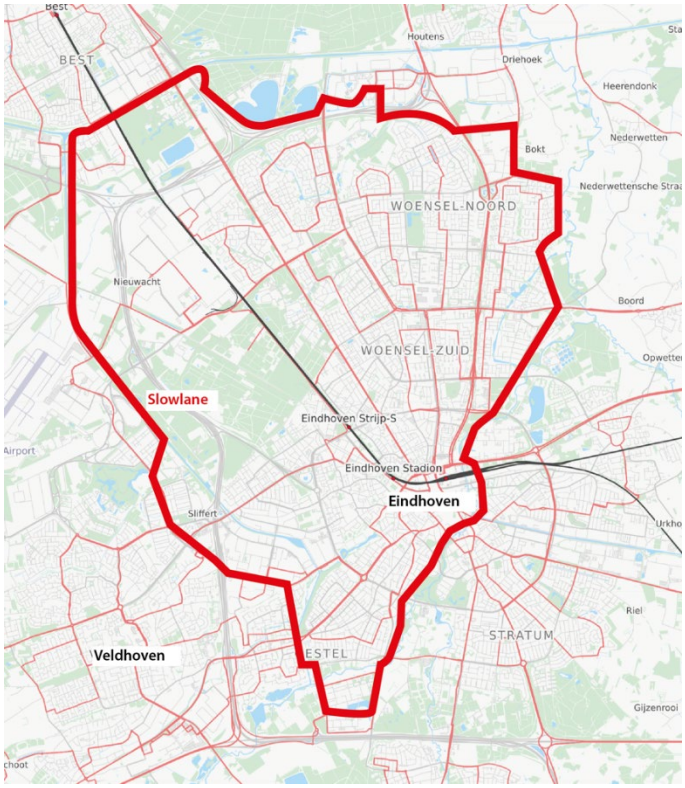


The Rijnwaalpad inter-city bicycle highway was established in 2015 to connect commuters from surrounding suburbs to the downtown cores of Arnhem to the north and Nijmegen to the south. The route spans 11 miles in total and features lengthy segments of solitary, fully separated bi-directional pathways, with some on-street bicycle facilities in urban areas. Table 4 highlights the BH's primary characteristics.

Table 4: Features of RijnWaalpad F325.

Features	Notes
Network Context	RijnWaalpad was the first cycling highway in the urban region of Arnhem-Nijmegen. As part of the nationwide cycling effort, the Province of Gelderland is in the process of developing a total of 60 miles of cycling highways.
Land Use Context	The route runs through four different municipalities and is partially retrofit in existing urban environments.
Path typology	The path features long stretches of a 13 ft wide solitary and separated bidirectional path, with smooth red asphalt. People bicycling receive priority at the majority of intersections, though the route sometimes mixes with on-street bikeways.
Connections and Destinations	The route connects to the City of Arnhem on the north end and the City of Nijmegen on the south end. In between these two urban areas, the route allows users to connect from the suburbs and country side. Intermediate connections to the underlaying general bicycle network are frequent.
Support Facilities	Custom-designed light fixtures (related to branding), a mid-way resting point, a sound barrier for people bicycling along A325 highway, several new underpasses to reduce path length and reduce number of crossings, and an iconic bicycle bridge help contribute to the user experience.

Case Study #2: Slowlane Eindhoven Netherlands



As part of an extensive regional network of fast bicycle routes in the Netherlands, the Slowlane is a regional loop that functions as the backbone to the local bicycle network. Established in 2012, the route features an iconic bicycle bridge and is primarily separated from traffic. Table 5 highlights the BH's primary characteristics.

Table 5: Features of Slowlane Eindhoven.

Features	Notes
Network Context	The Slowlane is a regional loop that functions as local backbone of the bicycle network. The route connects the City of Eindhoven with employment, commercial and school campuses in and around the city and region. This bicycle highway is part of an extensive network of fast routes in the Eindhoven region.
Land Use Context	The Slowlane runs through four municipalities (Eindhoven, Veldhoven, Best and Son, and Breugel). The region is known as a technology industry hub and has branded itself "Brainport." In addition to these employment locations, the Slowlane connects users to beautiful nature reserves such as the Dommel River Valley.
Path typology	The path is separated from other traffic, 13 ft (4 m) wide, and as free of conflicts as possible. Multiple (sometimes existing) underpasses/tunnels create grade-separated crossings.
Connections and Destinations	It connects the city center of Einghoven with surrounding industrial hubs and large companies (and thus employers) like ASML, Eindhoven Airport, the Brainport Innovation Campus, the High-Tech Campus, the University of Technology, and Philips.
Support Facilities	The iconic bicycle bridge Hovenring is part of the Slowlane. Other facilities include route-specific "S" shaped center markings and custom bicycle counter kiosks. A project is in progress for color-coded wayfinding of the regional bicycle highway network "Brainport Fietsnet" including a metro- like map and other wayfinding elements.

Case Study #3: Farumruten C95 Copenhagen, Denmark

Established in 2013, the Farumruten stretches 13 miles diagonally from northwest to southeast to connect users to downtown Copenhagen. Within the urban area of central Copenhagen, the route is separated from motor vehicles by curbs and parking. Table 6 highlights the BH's primary characteristics.

Table 6: Features of Farumruten C95

Features	Notes
Network Context	Regional bicycle highway network: Copenhagen region has a wide network of bicycle highways (Supercykelstier). This route is the second route of the regional network of 45 planned bicycle highways in collaboration with 27 municipalities with a total length of 464 miles (746 km). By 2021, 15 of 27 routes will be constructed.
Land Use Context	The C95 route connects Copenhagen and Farum through Gladsaxe and Furesø through multiple land-use contexts: partial urban, suburban, and rural (towards Farum on the northwest.)
Path typology	In the central area of Copenhagen, the path is primarily separated from motor traffic vertically with a curb, though at times the separation is a parking lane (parking-protected bikeway). In more rural areas, the path is wide and bidirectional with few intersections.
Connections and Destinations	The Farum route connects the urban areas Farum, Bistrup, Kirke Værløse, Værløse, Hareskovby, Bagsværd, Gladsaxe, Herlev, Mørkhøj, Brønshøj and the rest of Copenhagen. The route passes near the Farum transit station as well as stations in Skovbrynet and Nørrebro. In addition, the route runs close to stations in Værløse and Bagsværd.
Support Facilities	The route has good lighting and improved signal systems at specific crossings. Additionally, the path features new signage and markings, service stations and pumps every 2 km.

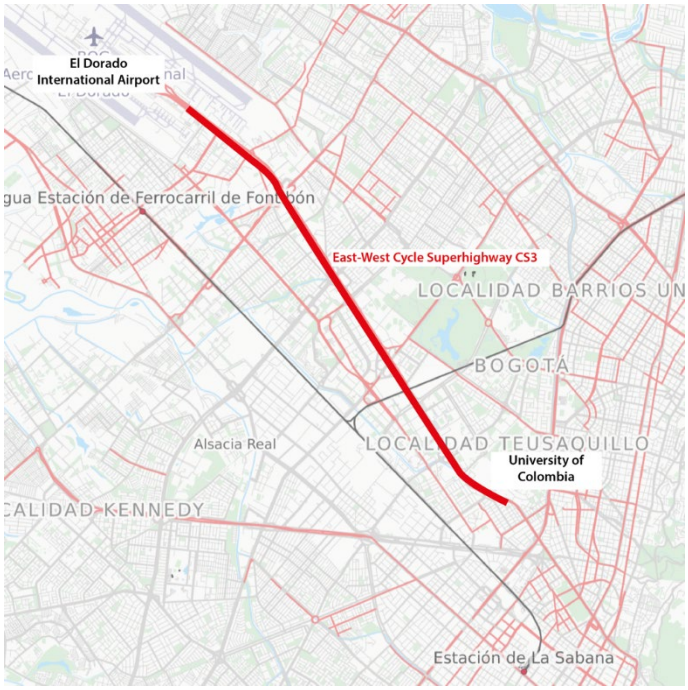
Case Study #4: East-West Cycle Highway (CS3) London, United Kingdom

Spanning 14 miles, London's BH sports bright blue pavement in sections and totem-style signage pillars to help users navigate to their destinations. Table 7 highlights the BH's primary characteristics.

Table 7: Features of CS3

Features	Notes
Network Context	East-west CS3 is part of a metropolitan-wide network of cycleways. In 2024 the Cycleway network is planned to have 280 miles (450 km) of new cycle paths (this includes mixing on quiet streets with low intensity streets, or without through-traffic).
Land Use Context	CS3 is retrofit in existing urban environment, connecting Paddington in the west to Barking in East London.
Path typology	1st generation: mostly blue painted bike lanes, with some protection. 2nd generation: Wide bidirectional curb-separated on-street pathway and exclusive bike lanes. Vehicle lanes were reduced in order to achieve this.
Connections and Destinations	This is the main East-West bicycle corridor, connecting Lancaster Gate – Hyde Park – Westminster – Embankment – Blackfriars – Tower Gateway – Shadwell – Westferry – Poplar – Blackwall – East India – Canning Town – Prince Regent Lane – North Beckton – Road corridors: A4209 – A402 – Hyde Park – A3211 – A1202 – A13
Support Facilities	CS3 has typical route signage with a pink logo. Another distinctive feature is the blue cycle lanes on some of the routes and totem-style signage pillars showing the main destinations on the route.

Case Study #5: Ciclorruta de la Calle 26, Avenida El Dorado Bogotá, Colombia



Established in 2012 with ongoing improvements and expansion, Bogota's Ciclorruta de la Calle 26 spans 5.4 miles connecting users from El Dorado International Airport to the University of Colombia, with many primary destinations in between. Table 8 summarizes key characteristics of the bike facility.

Table 8: Features of Ciclorruta de la Calle 26.

Features	Notes
Network Context	Bogota's *ciclorruta* network currently has approximately 186 miles (300 km) of bicycle paths.
Land Use Context	This bicycle highway is integrated with the TransMilenio (BRT) in the median of the corridor Avenida El Dorado from the International Airport El Dorado to the National University of Colombia.
Path typology	This route is a separate bicycle path in the median of a large arterial avenue (Avenida El Dorado). Several intersections have a bicycle underpass. Once on this *ciclorruta*, this is a high-quality and fast cycling facility.
Connections and Destinations	The bicycle highway is integrated with the TransMilenio in the middle of the corridor. Access to this *ciclorruta* is restricted to the combined bicycle and pedestrian bridges at the BRT stops; there is no intermediate neighborhood connectivity.
Support Facilities	The *ciclorruta* network includes bicycle parking facilities, information points and water points at strategic locations.

Case Study #6: Bicycle Skyway, Xiamen, China

Photo courtesy Ma-Weiwei.

The Bicycle Skyway is a 4.7 mile fully grade-separated pathway through the median of a multimodal transportation corridor in downtown Xiamen. With a goal of promoting modal shifts to bicycling, the route connects commuters to bus and BRT stations, as well as major destinations along the congested corridor. Table 9 highlights some of the route's unique traits.

Table 9: Features of Bicycle Skyway

Features	Notes
Network Context	Xiamen's Bicycle Skyway is a fully-separated bikeway that connects users to key destinations.
Land Use Context	The path is retrofitted to an existing highly-urbanized context, integrated with an elevated BRT construction in the median of main arterial traffic corridors. The bikeway has number of ramps and elevated constructions that tie different sections together with main destinations in one continuous facility.
Path typology	The Bicycle Skyway is a fully grade-separated pathway through the median of a multimodal transportation corridor. The path is wide enough to allow" social cycling" and easy passing.
Connections and Destinations	The grade separated bikeway has 11 connection points where users can enter or exit the route. The connections provide commuters with access to bus and BRT stations, shopping malls, public building and overpasses across the busy arterial street.
Support Facilities	The route also includes pedestrian bridges, bicycle parking and bicycle service stations.

2021 Caltrans Bay Area Bike Highway Survey #1

Email / E-Newsletter Toolkit

Dedicated Email

Subject: Would you use a bike highway to get around the Bay Area?

Body:

Dear [First Name],

Whether you ride a bike for fun, to commute, or as a weekend warrior, we want to hear from you!

Caltrans Bay Area is considering creating bike highways, which would allow you to safely bicycle long distances between major destinations throughout the nine-county Bay Area region. This exciting concept would provide greater connectivity for bikers of all levels, interests and abilities.

While there is no agreed-upon definition of a bike highway in California, Caltrans Bay Area is defining bike highways as bicycle facilities that:

- Allow for long-distance bicycle travel
- Enable uninterrupted bicycle travel (e.g. few stoplights or intersection crossings)
- Reduce physical barriers to destinations that people want to travel to and from

Caltrans Bay Area wants your input on which features will make bike highways safe, easy and fun for you to use! The survey should take 5–10 minutes to complete: https://www.surveymonkey.com/r/CaltransBayAreaBikeHighwaySurvey

For more details on this project, visit d4bikehighwaystudy.org.

E-newsletter Blurb

Calling all Bay Area bike enthusiasts! Whether you ride a bike for fun, to commute, or as a weekend warrior, we want to hear from you!

Caltrans Bay Area is considering creating bike highways, which would allow you to safely bicycle long distances between major destinations throughout the nine-county Bay Area region.

Have 5–10 minutes to spare? Let Caltrans Bay Area know if you would use a bike highway to get around the Bay Area by taking the Caltrans Bay Area Bike Highway Study Survey.

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2021 Caltrans Bay Area Bike Highway Survey #1

Social Media Toolkit

Channel	Copy	Image
Facebook	Would you use a bike highway to get around the Bay Area? No matter how you roll 🚴🛴🚲, @CaltransDist4 wants your input. Take their survey: https://www.surveymonkey.com/r/CaltransBayAreaBikeHighwaySurvey	*Use any image from folder labelled "FB + TW Ads"*
Twitter	Would you use a bike highway to get around the Bay Area? No matter how you roll 🚴🛴🚲, @CaltransD4 wants your input. Take their survey: https://www.surveymonkey.com/r/CaltransBayAreaBikeHighwaySurvey	*Use any image from folder labelled "FB + TW Ads"*
Instagram	Would you use a bike highway to get around the Bay Area? No matter how you roll 🚴🛴🚲, @caltransdistrict4 wants your input. Take their survey: https://www.surveymonkey.com/r/CaltransBayAreaBikeHighwaySurvey	*Use any image from folder labelled "IG Ads"*

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