CITY OF BERKELEY

BICYCLE PLAN

Approved May 2, 2017 by Berkeley City Council

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EXECUTIVE SUMMARY

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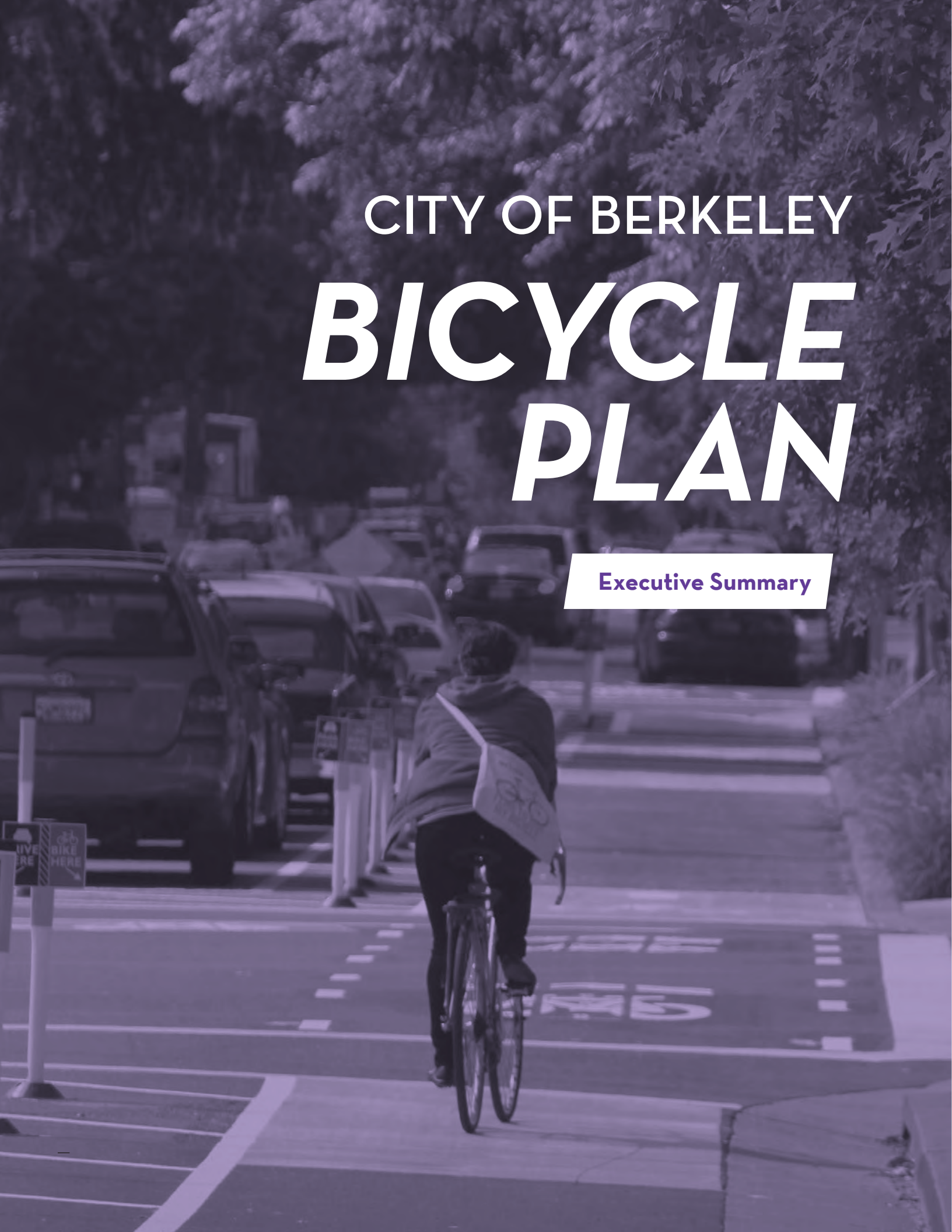


CITY OF BERKELEY

BICYCLE PLAN

Executive Summary

Berkeley is a bicycle city.

According to the US Census 2014 American Community Survey, Berkeley has the fourth highest bicycle commute mode share (8.5 percent) of any city in the United States. In practical terms, this means that nearly one out of every 10 Berkeley residents rides a bicycle to work as their primary transportation mode.

As nearly any Berkeleyan can tell you, getting to work is not the only reason people ride bicycles in this city. In Berkeley, people ride bikes for a myriad of purposes – to shop at the store or the farmer's market, to drop off or pick up their kids from school or day care, to visit the UC Berkeley campus, to go to concerts, restaurants, and social events, and for exercise. Cycling in Berkeley is not only an efficient, environmentally-friendly utilitarian mode of transport, but it is also a source of health and enjoyment. A central focus of this updated Bicycle Plan is how to improve the comfort, enjoyment, convenience, and fun of cycling as a viable strategy for achieving many of the City's health and wellness goals.

For nearly five decades, Berkeley has been a leader in the effort to promote the use of the bicycle for pleasant transportation and recreation. The first Berkeley Bicycle Plan—created in 1971—laid out a citywide network of bikeways which are still in use today.

The purpose of this updated Bicycle Plan is to make Berkeley a model bicycle-friendly city where bicycling is a safe, comfortable, and convenient form of transportation and recreation for people of all ages and abilities. Because this plan is being produced by the Public Works Department, the focus is on physical infrastructure changes that support cycling as a way to achieve the City's safety, health, and environmental goals.

VISION AND GOALS

Berkeley will be a model bicycle-friendly city where bicycling is a safe, comfortable, and convenient form of transportation and recreation for people of all ages and abilities.

GOALS

The Berkeley Bicycle Plan has three overarching goals which frame all of the policies, actions and recommendations in the plan:

GOAL 1: SAFETY FIRST

- Performance Measure: Zero bicycle-involved fatalities by 2025.
- Performance Measure: Zero bicycle-involved severe injuries by 2035.

GOAL 2: STRENGTH IN NUMBERS

- Performance Measure: Increase Berkeley's bicycle mode share by 50 percent by 2025, from approximately 10 percent to 15 percent.
- Performance Measure: Increase Berkeley's bicycle mode share by 100 percent by 2035, from approximately 10 percent to 20 percent.

GOAL 3: ALL AGES AND ABILITIES

- Performance Measure: Complete the Tier 1 Bikeway Network, including high-priority Bicycle Boulevards, Milvia Street Bikeway, Complete Street Corridor Studies (including Downtown and UC Berkeley Campus perimeter streets and the Southside Pilot Project), and the Ohlone Greenway, by 2025.
- Performance Measure: Complete the Tier 2 and Tier 3 Bikeway Network, including remaining Bicycle Boulevards, Complete Street Corridor Studies, and other bikeways by 2035.

EXISTING BIKEWAYS

Class I bikeways are multi-use or shared-use paths. They provide completely separated, exclusive right-of-way for bicycling, walking, and other nonmotorized uses.

Class II bicycle lanes are striped, preferential lanes on roadways for one-way bicycle travel. Some Class II bicycle lanes include striped buffers that add a few feet of separation between the bicycle lane and traffic lane or parking aisle.

Class III bicycle routes are signed bicycle routes where people riding bicycles share a travel lane with people driving motor vehicles. May include shared lane markings (sharrows) or other pavement stenciling. Because they are mixed-flow facilities, Class III bicycle routes are only appropriate for low-volume streets with slow travel speeds.

A **Class IV bikeway**, also known as a cycle track or separated/protected bikeway, is an on-street bicycle lane that is physically separated from motor vehicle traffic by a vertical element or barrier, such as a curb, bollards, or parking aisle.

***Table ES-1:** Existing Bicycle Boulevard Network*

BIKEWAY TYPE	MILEAGE
Class IA: Paved Paths	**13.9 miles**
Ohlone Greenway	*1.2 miles*
San Francisco Bay Trail	*7.4 miles*
Aquatic Park Path	*2.5 miles*
9th Street Path	*0.1 miles*
West Street Path	*0.5 miles*
Other Paths	*2.2 miles*
Class IB: Unpaved Paths	**5.3 miles**
Class IIA: Standard Bicycle Lane	**11.7 miles**
Class IIB: Upgraded Bicycle Lane	**0.3 miles**
Buffered Bicycle Lanes	*0.3 miles*
Class IID: Contraflow Bicycle Lane	**0.4 miles**
Class IIIA: Signage-only Bicycle Route	**4.5 miles**
Class IIIC: Standard Sharrows	**2.7 miles**
Class IIIE: Bicycle Boulevard	**11.9 miles**
Class IVA: One-way Cycle Track/ Protected Bikeway	**0.1 miles**
Total	**50.8 miles**
Berkeley Bicycle Boulevard Network	**15.8 miles**

*Berkeley's Bicycle Boulevard network comprises segments of Class I, II and III facilities.

BICYCLE BOULEVARDS

Berkeley's existing bikeway network includes nearly 16 miles of Bicycle Boulevards. A Bicycle Boulevard is a roadway intended to prioritize bicycle travel for people of all ages and abilities. The first seven Bicycle Boulevards in Berkeley were developed through community workshops in 1999 with the goal of providing safe, convenient, and low stress bikeways on pleasant neighborhood streets. In order to achieve this goal, Bicycle Boulevards are sited only on appropriate streets without large truck or transit vehicles, and where traffic volumes and speeds are already low, or can be further reduced through traffic calming. For convenience, Bicycle Boulevard routes should not require people bicycling to stop any more frequently than they would on a parallel major street.

Elements of Bicycle Boulevards

DISTINCT VISUAL IDENTITY

Unique pavement markings and wayfinding signs increase visibility of Bicycle Boulevard routes, assist with navigation, and alert drivers that the roadway is a priority route for people bicycling.

SAFE, CONVENIENT CROSSINGS

Traffic controls, warning devices, and/or separated facilities at intersections help facilitate safe and convenient crossings of major streets along the Bicycle Boulevard network.

BICYCLE PRIORITY

Traffic calming treatments such as traffic circles, diverters, and chicanes, sometimes in place of existing stop signs, can help prioritize bicycle through-travel and discourage cut-through motor vehicle traffic.

PUBLIC OUTREACH

The project involved an extensive public engagement process which included two public open houses, regular updates to the Bicycle Subcommittee of the Transportation Commission, information tables at nearly a dozen local community events (e.g., farmers' markets, street fairs), outreach at the 2015 and 2016 Bike to Work Day events, a project website with an ongoing comment page, and a bicycling preference survey. Over 1,000 comments were received throughout the process from gathering existing conditions through review of the public draft plan document.

The main themes public input indicated support for include:

- Safer crossings at major streets along the Bicycle Boulevard network
- Designated bikeways along major street corridors, especially those serving downtown and campus area
- Physical separation in bikeway design along major streets, along corridors and at intersections
- Improved pavement quality along the entire bikeway network

BERKELEY RESIDENT SURVEY

As part of the public outreach, a survey was conducted of Berkeley residents asking about their interests, current habits, concerns, and facility preferences around bicycling. The survey used address-based random sampling to ensure responses were representative of the Berkeley population. Survey staff interviewed 660 Berkeley residents between March 2 and March 28, 2015, yielding a margin of error of +/- 4 percent and a confidence level of 95 percent.

From the survey results, the general population of Berkeley was classified into categories of transportation bicyclists by their differing needs and bicycling comfort levels given different roadway conditions, using typologies originally developed by Portland City Bicycle Planner Roger Geller. Geller's typologies have been carried forward into several subsequent studies in cities outside Portland at the national level, and were used in the City of Berkeley analysis for consistency with national best practices and comparison to other top cycling cities.

Under Geller's classification, the population of a city can be placed into one of the four following groups based on their relationship to bicycle transportation: "Strong and Fearless," "Enthusiastic and Confident," and "Interested but Concerned." The fourth group are non-bicyclists, called the "No Way No How" group.

These categories are meant to guide efforts to assess an area's market demand for bicycling as a means of transportation, such as commuting to work and running errands.

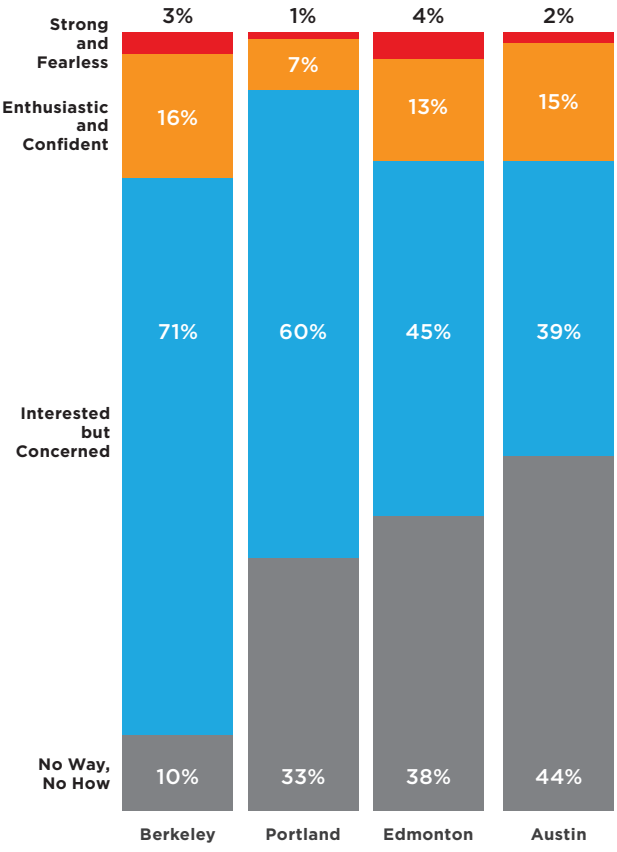
The survey found that three percent of Berkeley residents are Strong and Fearless bicyclists, 16 percent are Enthusiastic and Confident, 71 percent are Interested but Concerned, and 10 percent fall into the No Way No How category. In other words, 90 percent of Berkeley residents already bicycle or would consider bicycling if the right bikeway facility or roadway conditions were available. That is a larger percentage than any other city that has conducted a similar study, including Portland, as shown at right.

***Table ES-2:** Four Types of Bicyclists*

TYPE OF BICYCLIST	DESCRIPTION
Strong and Fearless	This group is willing to ride a bicycle on any roadway regardless of traffic conditions. Comfortable taking the lane and riding in a vehicular manner on major streets without designated bicycle facilities.
Enthusiastic and Confident	This group consists of people riding bicycles who are confident riding in most roadway situations but prefer to have a designated facility. Comfortable riding on major streets with a bike lane.
Interested but Concerned	This group is more cautious and has some inclination towards bicycling, but is held back by concern over sharing the road with cars. Not very comfortable on major streets, even with a striped bike lane, and prefer separated pathways or low traffic neighborhood streets.
No Way No How	This group comprises residents who simply are not interested at all in bicycling, may be physically unable, or don't know how to ride a bicycle. They are unlikely to adopt bicycling in any way.

LEVEL OF TRAFFIC STRESS ANALYSIS

Building on the bicycling preference survey and user typologies, a Level of Traffic Stress (LTS) analysis was conducted for Berkeley's roadway network. Traffic stress is the perceived sense of danger associated with riding in or adjacent to vehicle traffic; studies have shown that traffic stress is one of the greatest deterrents to bicycling. The less stressful – and therefore more comfortable – a bicycle facility is, the wider its appeal to a broader segment of the population.



Roger Geller's "Four Types of Transportation Cyclists" distribution for Berkeley, Portland, OR, Edmonton, AB, and Austin, TX.

A bicycle network will attract a large portion of the population if it is designed to reduce stress associated with potential motor vehicle conflicts and if it connects people bicycling with where they want to go. Bikeways are considered low stress if they involve very little traffic interaction by nature of the roadway's vehicle speeds and volumes (e.g., a shared, low-traffic neighborhood street) or if greater degrees of physical separation are placed between the bikeway and traffic lane on roadways with higher traffic volumes and speeds (e.g., a separated bikeway or cycletrack on a major street). An LTS Analysis is an objective, data-driven evaluation model which identifies streets with high levels of traffic stress, gaps in the bicycle network, and gaps between streets with low levels of traffic stress.

The level of traffic stress scores were mapped to illustrate the low stress connections and gaps throughout Berkeley. It is important to note that people tolerate different levels of stress; a strong and fearless bicyclist will feel less stress than an interested but concerned bicyclist. The LTS results map approximates the user experience for the majority of Berkeley residents, however people may have differing opinions of traffic stress depending on their own experiences.

LEVEL OF TRAFFIC STRESS ANALYSIS

Traffic stress is the perceived sense of danger associated with riding in or adjacent to vehicle traffic.

Level of Traffic Stress	*Comfortable up to % of Berkeley Residents**	*Types of Cyclists*
LTS 1 • LOW STRESS • SUITABLE FOR ALL AGES & ABILITIES, INCLUDING CHILDREN	**90%**	Interested, But Concerned
LTS 2 • LOW STRESS, WITH ATTENTION REQUIRED • INDICATES TRAFFIC STRESS THAT MOST ADULTS WILL TOLERATE	**79%**	Enthusiastic & Confident
LTS 3 • MORE STRESSFUL THAN LEVEL 2 • REQUIRES ATTENTION, SUITABLE FOR ADULTS WITH CONFIDENCE TO BICYCLE	**16%**	Strong & Fearless
LTS 4 • MOST STRESSFUL • SUITABLE ONLY FOR MOST TRAFFIC-TOLERANT	**3%**	

**According to the Berkeley Bicycle Plan Public Survey*

LEVEL OF TRAFFIC STRESS FINDINGS

Figure ES-1 on the following page depicts low stress (LTS 1 and 2) streets and intersections on Berkeley's existing on-street bicycle network, along with high stress (LTS 4) gaps. This map helps illustrate how low stress streets in Berkeley's bikeway network are often disconnected by high stress roadways and intersections. A continuous low stress network is essential for bicyclists of all abilities to travel easily throughout the network.

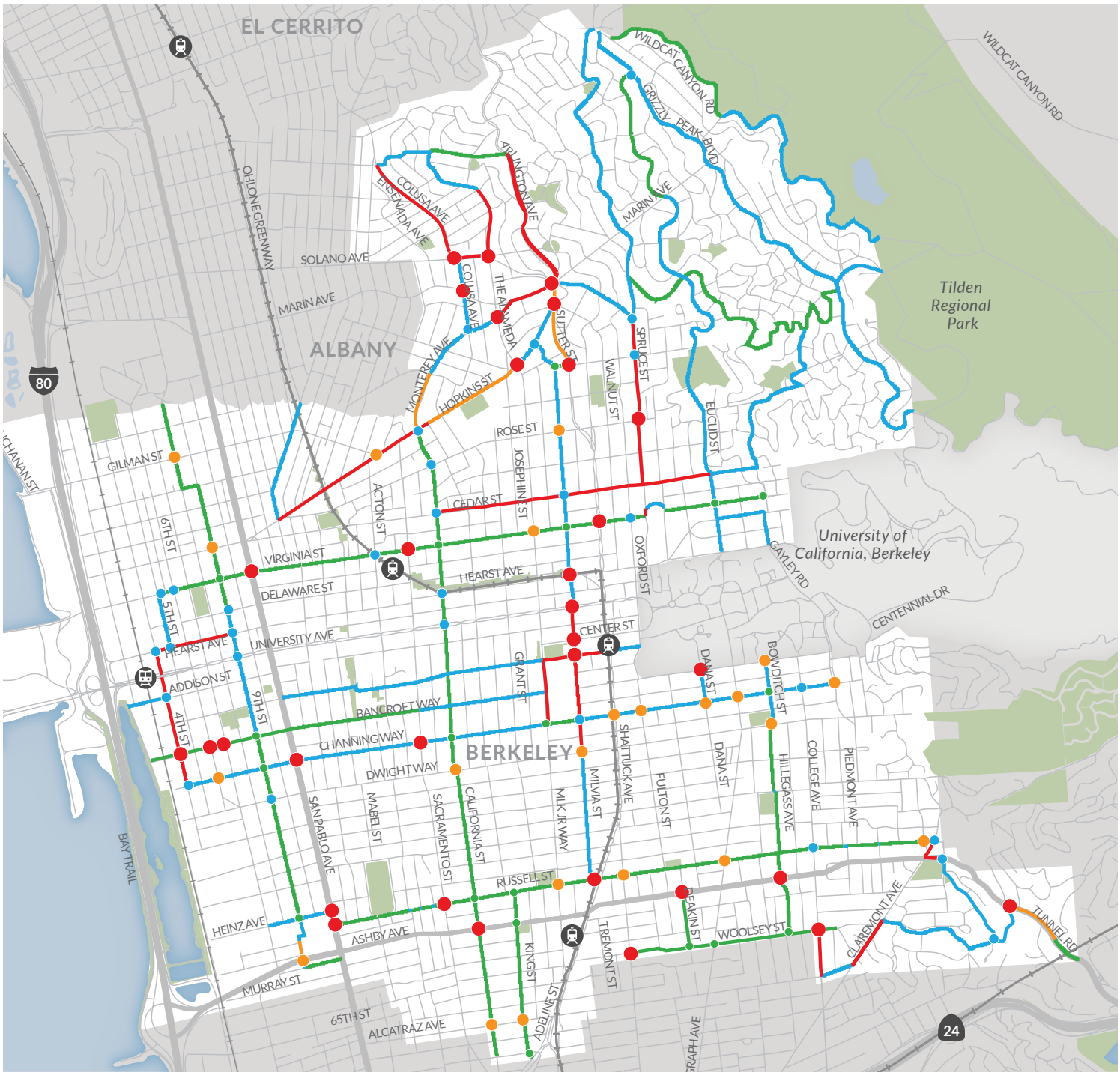


FIGURE ES-1: LOW STRESS NETWORK & INTERSECTIONS WITH HIGH STRESS NETWORK & INTERSECTION GAPS

CORRIDORS

- LTS 1 - ALL AGES AND ABILITIES
- LTS 2 - INTERESTED BUT CONCERNED

NETWORK GAPS

- LTS 3 - ENTHUSIASTIC AND CONFIDENT
- LTS 4 - STRONG AND FEARLESS

INTERSECTIONS

- LTS 1 - ALL AGES AND ABILITIES
- LTS 2 - INTERESTED BUT CONCERNED

INTERSECTION GAPS

- LTS 3 - ENTHUSIASTIC AND CONFIDENT
- LTS 4 - STRONG AND FEARLESS

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PROJECT RECOMMENDATIONS

As each project is taken up for possible implementation, stakeholder constituencies will be consulted and have the opportunity to provide input. In addition, in commercial and manufacturing districts, particularly in West Berkeley, the special needs and hazards associated with these uses, including frequent passage and parking, loading and unloading of trucks of all sizes, shall be considered such that everyday functioning and economic vitality of these areas are not unduly burdened. Furthermore, for the network to work, it must be complete, without gaps. Completing the low stress network is a priority for the city to meet our Climate Action Plan goals.

This Plan's recommended bikeway network supports a vision for Berkeley where bicycling is safe, comfortable, and convenient for people of all ages and abilities. These recommendations were guided by the Plan's goals and policies, a data-driven safety and demand analysis, and extensive community input. An overarching bikeway network vision emerged through this process: a continuous and connected system of Low Stress bikeways that provide safer and more comfortable travel for all users and link to all key destinations in Berkeley. **Figure ES-2** illustrates how the Low Stress Bikeway Network Vision of low-traffic Bicycle Boulevards, protected major-street bikeways, and separated shared-use paths, all with safer intersection crossings, can form a network on which 79 percent of Berkeley's population would feel comfortable bicycling.

Safe bikeway connections are especially important for parents riding with their children, or for older children riding independently. And in terms of the potential for reducing traffic congestion and helping to achieve the City's climate action goals, school trips account for a significant portion of morning auto traffic, and yet are often less than a mile in length. Therefore it was important that the Low Stress Network connect to as many schools in Berkeley as possible to provide parents and children the option of a completely low stress bicycle trip from their residence to school. **Figure ES-3** illustrates the Low Stress Network in relation to Berkeley's schools; nearly all the city's schools are within one-eighth of a mile (approximately one block) from a Low Stress facility.

This Plan recommends nearly $34.5 million in infrastructure recommendations to help Berkeley achieve its vision of becoming a model bicycle-friendly city. **Figure ES-4** displays the complete recommended bikeway network. **Table ES-3** on the next page breaks down the recommended network by facility type, with corresponding cost estimates.

***Table ES-3:** Summary of Project Recommendations and Cost Estimates*

TYPE	MILEAGE	COST ESTIMATE
Class 1A: Paved Path	1.5 miles	$5,285,700
Class 2A: Standard Bike Lane	0.1 miles	$10,700
Class 2B: Upgraded Bike Lane	3.0 miles	$541,500
Class 3C: Sharrows	13.9 miles	$71,600
Class 3E: Bicycle Boulevard	12.4 miles	$621,900
Class 4: Cycletrack	18.4 miles	$9,903,300
Complete Street Corridor Interim Treatments	17.0 miles	$1,181,400
Intersection and Traffic Calming Improvements	–	$16,855,000
Total	**66.3 miles**	**$34,471,100**

COMPLETE STREET CORRIDOR STUDIES

As defined by the Berkeley Complete Streets Policy, "Complete Streets" describes a comprehensive, integrated transportation network with infrastructure and design that allows safe and convenient travel along and across streets for all users, including people walking, people bicycling, persons with disabilities, people driving motor vehicles, movers of commercial goods, users and operators of public transportation, emergency responders, seniors, youth, and families. Providing a complete network does not necessarily mean that every street will provide dedicated facilities for all transportation modes, but rather that the transportation network will provide convenient, safe, and connected routes for all modes of transportation within and across the City. For the purposes of bikeway planning, the City of Berkeley considers both the major/collector street and parallel streets part of a Complete Street Corridor; potential bikeways on both the major/collector street bikeway and on parallel streets should be evaluated as part of a Complete Street Corridor Study. Of the major and collector streets shown in **Figures ES-2**, **ES-3**, and **ES-4** as requiring a Class IV Cycletrack to meet LTS 1 or 2, most of them will require further study in order to evaluate their suitability for this treatment and impacts on other modes of transportation. These major and collector streets provide access to local Berkeley businesses. Some facilitate direct cross-town or interjurisdictional travel not duplicated by a parallel street. They currently serve multiple modes of transportation and on-street parking, requiring further consideration above and beyond that of bicycle travel. These streets are therefore labeled as "Complete Street Corridor Studies" on **Figure ES-2** and other figures within the Bicycle Plan.

Class IV Cycle Tracks and other bikeway types that might impact transit operations, parking, or roadway capacity will not be implemented without these Complete Street Corridor Studies that will include a traffic study, environmental analysis, public process, and coordination with all affected State, County, and local transit agencies. Potential bikeways to be considered as part of future Complete Street Corridor Studies will be evaluated in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan. Studies to consider the inclusion of bikeways will be coordinated with proposed improvements to transit performance on Primary Transit Routes, such as bus boarding islands, transit-only lanes, transit signal priority/queue jump lanes, far-side

bus stop relocations, and other improvements as described in the AC Transit Major Corridor Study. In addition, these studies should approach Secondary Transit Routes as opportunities for transit improvements, such as bus stop optimization and relocation, among other potential improvements. At the conclusion of the Complete Streets Corridor Study process, design alternatives which have a significant negative effect on transit on Primary Transit Routes will not be recommended. Criteria to define what constitutes a significant negative effect on transit will be developed and applied during the Study process for each corridor. Example criteria for evaluating transit impacts are provided in **Section 5.7** of this Plan. Consideration of how to allocate limited public right-of-way among various travel modes will be made consistent with Alameda County Transportation Commission modal priorities and the City of Berkeley General Plan.

These corridors may have interim treatments installed while the corridor study and final recommended design are being completed. Interim treatments are those that do not require a full Complete Streets Corridor Study. Interim or phased treatments may still require traffic study, interagency coordination, and public process if they impact roadway capacity, parking, or transit operations. Interim or phased treatments should not negatively impact existing transit operations; mitigations should accompany interim treatments to ensure no degradation of transit service. For example, Shared Roadway Bicycle Markings may be installed, or existing bike lanes may first be colored green, then later converted into a Class IV Cycletrack if feasible without negatively impacting existing or planned transit operations on Primary or Secondary Transit Routes.

For more information about future Complete Street Corridor Studies, see **Section 5.7**, **Section 6.7**, **Appendix E**, and **Appendix F**.

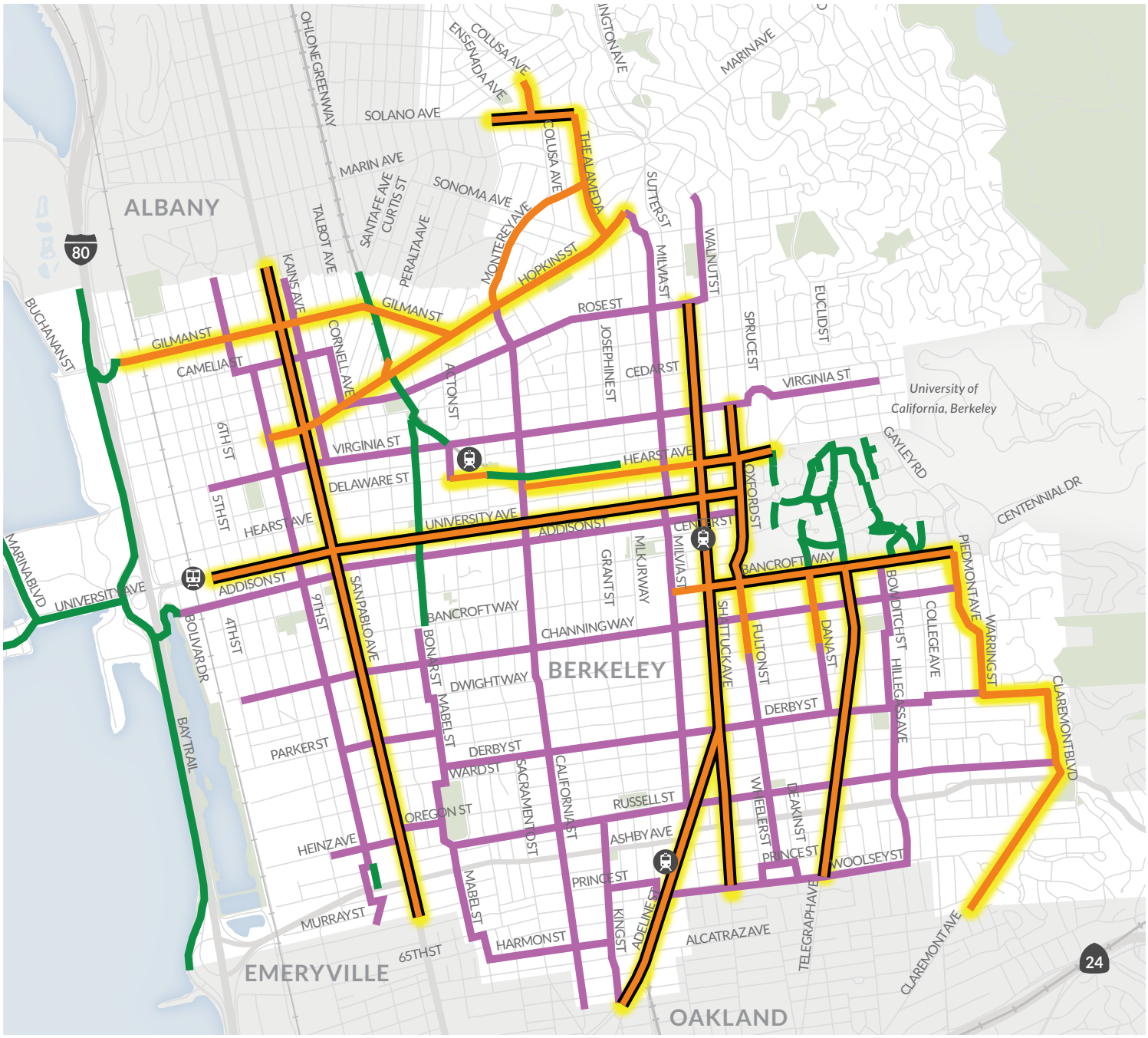

FIGURE ES-2: LOW-STRESS BIKEWAY NETWORK VISION

- PAVED PATH
- BICYCLE BOULEVARD NETWORK
- CYCLETRACK [4]

COMPLETE STREET CORRIDOR STUDIES - LOW STRESS BIKEWAY RECOMMENDATION

- STUDY CYCLETRACK [4]*
- PRIMARY TRANSIT ROUTE - STUDY CYCLETRACK [4]*

**Complete Street Corridor Studies are proposed multimodal transportation studies, not planned projects. Class IV Cycle Tracks and other bikeway types that might impact transit operations, parking, or roadway capacity will not be implemented without Complete Street Corridor Studies that will include a traffic study, environmental analysis, public process, and coordination with all affected State, County, and local transit agencies. Potential bikeways to be considered as part of future Complete Street Corridor Studies will be evaluated in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan, as well as recommendations from AC Transit's Major Corridors Study. For further information, see Section 5.7 of the Berkeley Bicycle Plan.*

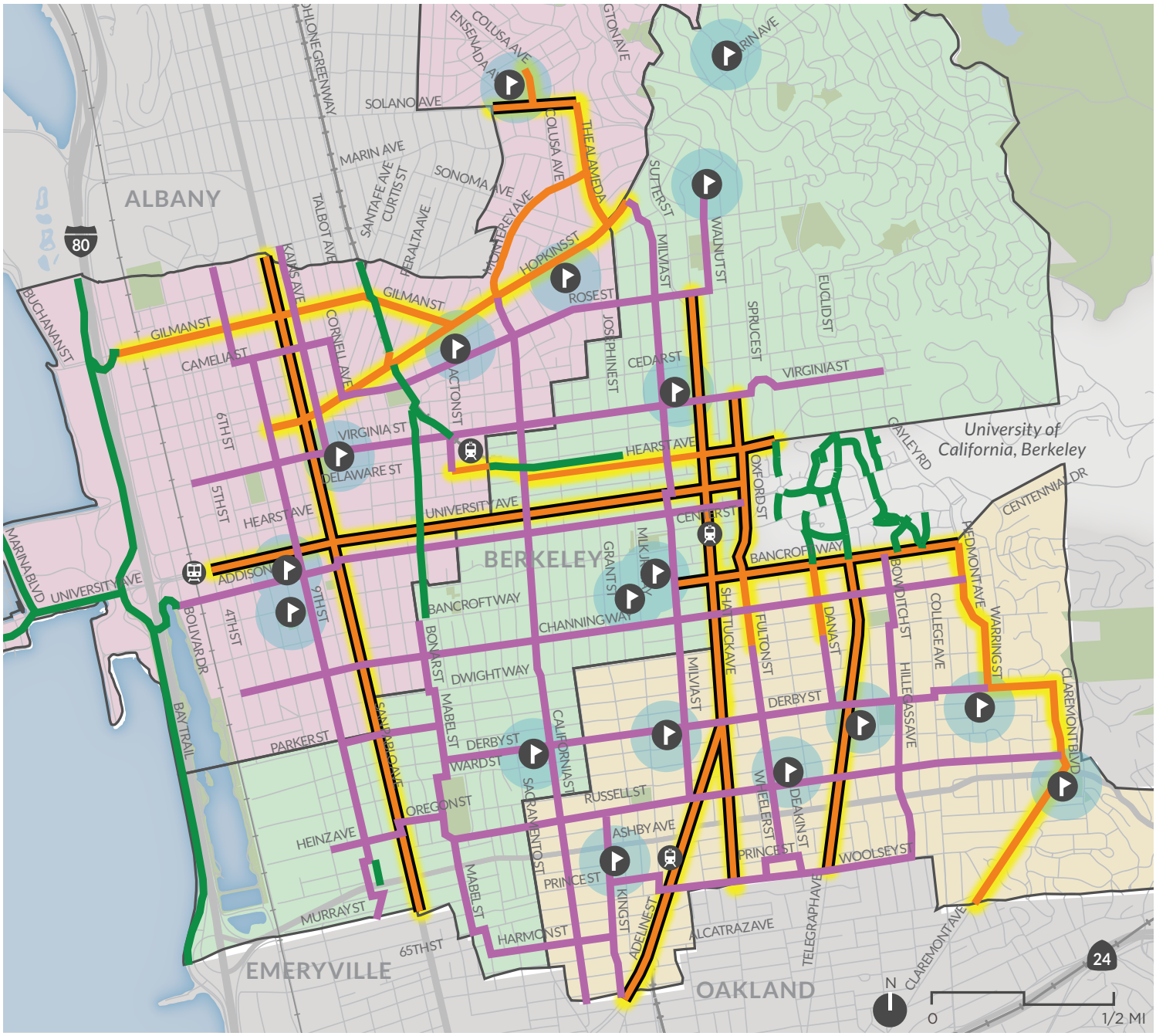

FIGURE ES-3: LOW-STRESS BIKEWAY NETWORK VISION WITH BERKELEY SCHOOLS

- PAVED PATH
- BICYCLE BOULEVARD NETWORK
- CYCLETRACK [4]

COMPLETE STREET CORRIDOR STUDIES - LOW STRESS BIKEWAY RECOMMENDATION

- STUDY CYCLETRACK [4]*
- PRIMARY TRANSIT ROUTE - STUDY CYCLETRACK [4]*

- SCHOOL WITH 1/8 MILE BUFFER
- ENROLLMENT BOUNDARIES

**Complete Street Corridor Studies are proposed multimodal transportation studies, not planned projects. Class IV Cycle Tracks and other bikeway types that might impact transit operations, parking, or roadway capacity will not be implemented without Complete Street Corridor Studies that will include a traffic study, environmental analysis, public process, and coordination with all affected State, County, and local transit agencies. Potential bikeways to be considered as part of future Complete Street Corridor Studies will be evaluated in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan, as well as recommendations from AC Transit's Major Corridors Study. For further information, see Section 5.7 of the Berkeley Bicycle Plan.*

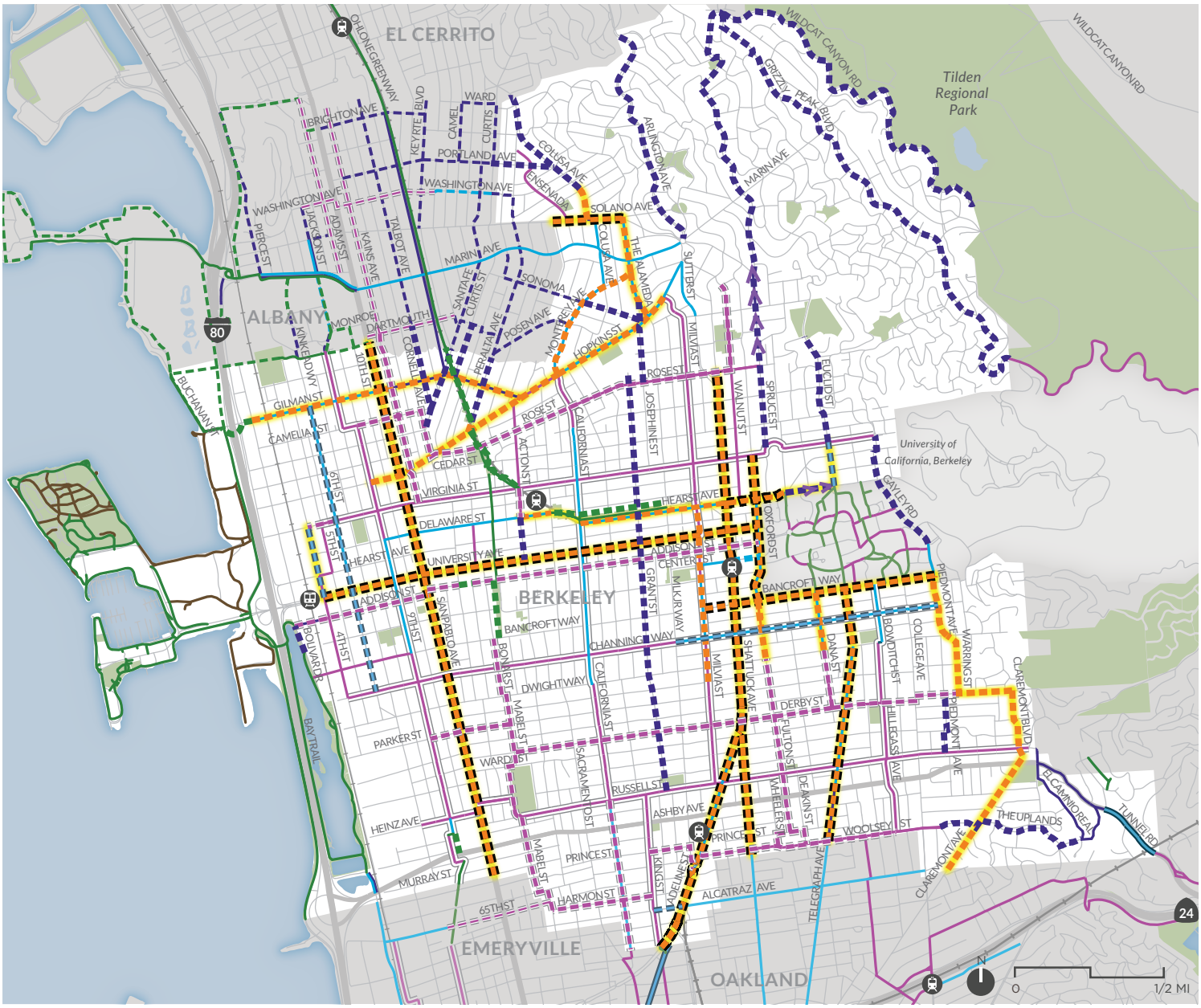

FIGURE ES-4: RECOMMENDED NETWORK IMPROVEMENTS

CLASS 1
- PAVED PATH [1A]

CLASS 2
- STANDARD BIKE LANE [2A]
- UPGRADED BIKE LANE [2B]

CLASS 3
- SHARROWS [3C]
- UPHILL CLIMBING LANE/ DOWNHILL SHARROWS [3C]
- BIKE BOULEVARD [3E]

CLASS 4
- CYCLETRACK [4]

COMPLETE STREET CORRIDOR STUDIES - LOW STRESS BIKEWAY RECOMMENDATION
- STUDY CYCLETRACK [4]*
- PRIMARY TRANSIT ROUTE - STUDY CYCLETRACK [4]*
- UPGRADED BIKE LANE [2B]
- UPHILL CLIMBING LANE/ DOWNHILL SHARROWS [3C]

EXISTING FACILITIES
- PAVED PATH [1A]
- UNPAVED PATH [1A]
- STANDARD BIKE LANE [2A]
- UPGRADED BIKE LANE [2B]
- SIGNAGE-ONLY [3A]
- SHARROWS [3C]
- BICYCLE BOULEVARD
- CYCLETRACK [4]

BICYCLE BOULEVARD NETWORK

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**Complete Street Corridor Studies are proposed multimodal transportation studies, not planned projects. Class IV Cycle Tracks and other bikeway types that might impact transit operations, parking, or roadway capacity will not be implemented without Complete Street Corridor Studies that will include a traffic study, environmental analysis, public process, and coordination with all affected State, County, and local transit agencies. Potential bikeways to be considered as part of future Complete Street Corridor Studies will be evaluated in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan, as well as recommendations from AC Transit's Major Corridors Study. For further information, see Section 5.7 of the Berkeley Bicycle Plan.*

SUPPORT FACILITIES

Bicycle Detection

Detection of bicyclists at actuated (not pre-timed) traffic signals is important for safety of bicyclists and motorists. The California Manual on Uniform Traffic Control Devices (CA MUTCD) requires that all new and modified traffics signals be able to detect bicyclists with passive detection (rather than having to push a button). This Plan recommends that the City of Berkeley continue to adhere to this requirement by ensuring passive detection of bicyclists at all signalized intersections.

Bicycle Parking

Bicycle parking is available throughout Berkeley, but many locations do not provide an adequate amount of bike parking to meet demand. As such, many bicyclists instead lock their bikes to street fixtures such as trees, telephone poles, and sign poles.

RECOMMENDED TYPES AND QUANTITIES OF BICYCLE PARKING

Bicycle parking can be categorized into short-term and long-term parking. Sidewalk bicycle racks or bicycle corrals are preferred for short-term bike parking (less than two hours), serving people who leave their bicycles for relatively short periods of time – typically for shopping, errands, eating or recreation. Short-term bicycle racks provide a high level of convenience but relatively low level of security.

Long-term bike parking includes bike lockers, bike rooms, or Bike Stations. Long-term parking serves people who intend to leave their bicycles for longer periods of time and is typically found at workplaces and in multifamily residential buildings, transit stations, and other commercial buildings. These facilities provide a high level of security but are less convenient than bicycle racks. Berkeley has bike lockers available citywide at BART and Amtrak stations.

***Figure ES-5**: Types of Bicycle Racks*

Inverted U-Rack | **Post & Ring** | **Circle**

The City has developed specifications to assist architects, engineers and contractors with bicycle rack placement and installation. These are available at **www.ci.berkeley.ca.us/uploadedFiles/Public_Works/Level_3_Transportation/Bike_Rack_Specs_Installation_Sept2008.pdf**.

Expanded Bicycle Parking Design Guidelines and recommended quantities by land use can be found in **Appendix F: Design Guidelines**.

IMPLEMENTATION

Project Prioritization

The project recommendations were divided into three implementation tiers based on a set of evaluation criteria that included safety, community support and equity factors. **Figure ES-6** shows the recommended project network by tier.

Tables that show the projects in each corridor are included in **Appendix E: Project Recommendations and Prioritization Tables.**

Table ES-4 shows the planning-level cost estimates to implement each tier.

Table ES-4: Planning-Level Capital Cost Estimates

TIER	PLANNING LEVEL COST ESTIMATE
Tier 1	$26,318,900
Tier 2	$4,658,400
Tier 3	$3,493,800
Total	**$34,471,100**

Pilot Projects

"Pilot projects" are a way to test the impacts of changes to the transportation network by temporarily constructing improvements using non-permanent materials, in place for a specified, limited amount of time. These projects enable the City to study the real-world efficacy of such changes, often at a relatively modest cost due to the short-term materials used. Utilizing before and after data collection, they are monitored to understand benefits and tradeoffs, with the goal of adjusting the final design before committing to a more expensive permanent capital project.

Short-term demonstration projects, sometimes called tactical urbanism or temporary installations, are typically for a few days in order to quickly evaluate a project and to gather feedback from the public. Demonstration projects usually use cones, temporary marking tape, moveable planters, and other non-permanent materials that can easily be installed, modified, and removed, as needed. Longer-term pilot projects can be installed for a longer period of time, typically weeks or months, prior to potential permanent implementation. This allows for extensive data collection and public input, especially for complex multi-modal projects.

Materials such as traffic paint, flexible traffic delineator posts, and moveable planters are often used during pilot projects and then may be later upgraded to permanent treatments such as thermoplastic, asphalt, concrete, and rigid bollards.

Both Demonstration and Long-term Pilots should be approached from a Complete Street design perspective, in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan. Pilot Projects should integrate improvements for all modes of transportation whenever possible, including consideration of people walking, biking, riding transit, and driving. For example, pilot projects on Primary or Secondary Transit Routes should seek to test transit operations and access improvements whenever possible, utilizing the latest national design best practices such as the National Association of City Transportation Officials (NACTO) Transit Street Design Guide and Urban Street Design Guide. Local guidance such as the forthcoming AC Transit Design Standards and Guidelines Manual for Safe and Efficient Multimodal Transit Stops and Corridors will also be consulted.

FIGURE ES-6: PROJECT PRIORITIZATION CORRIDORS

- TIER 1 PRIORITY PROJECTS
- TIER 2 PRIORITY PROJECTS
- TIER 3 PRIORITY PROJECTS
- COMPLETE STREET CORRIDOR STUDIES - LOW STRESS BIKEWAY RECOMMENDATION*
- COMPLETE STREET CORRIDOR STUDIES - PRIMARY TRANSIT CORRIDOR*
- PARK/REC
- RAILROAD
- BART STATION
- AMTRAK STATION

**Complete Street Corridor Studies are proposed multimodal transportation studies, not planned projects. Class IV Cycle Tracks and other bikeway types that might impact transit operations, parking, or roadway capacity will not be implemented without Complete Street Corridor Studies that will include a traffic study, environmental analysis, public process, and coordination with all affected State, County, and local transit agencies. Potential bikeways to be considered as part of future Complete Street Corridor Studies will be evaluated in the context of the modal priorities established by the Berkeley General Plan Transportation Element and the Alameda County Transportation Commission Countywide Multimodal Arterial Plan, as well as recommendations from AC Transit's Major Corridors Study. For further information, see Section 5.7 of the Berkeley Bicycle Plan.*

OPERATIONS AND MAINTENANCE

The primary maintenance policy of this Plan is to "maintain designated bikeways to be comfortable and free of hazards to bicycling," which includes incorporating a higher standard of care for bikeways into guidelines and timetables for maintenance activities, including repaving. Specific actions under this policy include developing and implementing an appropriate minimum paving surface standard for Bicycle Boulevards and other low stress bikeways, and updating the repaving project selection methodology to prioritize Bicycle Boulevards and other low stress bikeways to ensure that the minimum paving surface standard is maintained.

Plan Implementation and Staffing Costs

Capital project costs only capture a portion of the resources needed to fully implement this Plan. In addition to base capital costs, contingencies are added to capture unanticipated increases in the cost of project materials and/or labor. The City will need to utilize a combination of staff and consultant resources for project delivery phases that include Planning (conceptual project development and funding); Preliminary Engineering (environmental clearance and design); Final Design; and Construction Management (contractor oversight, inspection, and invoicing). **Table ES-5** provides a planning-level estimate of these "soft costs" associated with delivering Tier 1, 2, and 3 projects.

Table ES-5: *Total Planning-Level Implementation Cost Estimate*

TIER	YEARS	CAPITAL COST	CAPITAL CONTINGENCY (10%)	CAPITAL TOTAL
Tier 1	2016-2025	$26,318,900	$2,631,890	$28,950,790
Tier 2	2025-2035	$4,658,400	$465,840	$5,124,240
Tier 3	2025-2035	$3,493,800	$349,380	$3,843,180
Totals		**$34,471,100**		**$37,918,210**

Table continues below

TIER	PLANNING (25%)	PRELIMINARY ENGINEERING (25%)	CONSTRUCTION MANAGEMENT (15%)	TOTAL "SOFT COSTS"	TOTAL COST ESTIMATE
Tier 1	$7,237,700	$7,237,700	$4,342,600	$18,818,000	$47,768,800
Tier 2	$1,281,100	$1,281,100	$768,600	$3,330,800	$8,455,000
Tier 3	$960,800	$960,800	$576,500	$2,498,100	$6,341,300
Totals				**$24,646,900**	**$62,565,100**