

PBIC Webinar

Pedestrian and Bicycle Safety on University Campuses



Bob Schneider, Professor, University of Wisconsin-Milwaukee

Todd Henry, Transportation Planner, UC Berkeley

Kathryn Zeringue, Transportation Demand Management Coordinator, NC State University

Oct. 16, 1 pm



Pedestrian and Bicycle
Information Center



Today's Presentation

- ⇒ **Introduction and housekeeping**
- ⇒ **Presentations**
- ⇒ **Questions at the end**



Webinar Issues

⇒ **Audio issues?**

Dial into the phone line instead of using “mic & speakers.”

⇒ **Webinar issues?**

Re-Load the webpage and log back into the webinar. Or send note of an issue through the Question box.

⇒ **Questions?**

Submit your questions at any time in the Questions box.



CM Credits and Email

⇒ Certificate of Attendance

You will receive a certificate of attendance by email from the UNC Highway Safety Research Center



Pedestrian and Bicycle Information Center

Dear James,

Thank you for registering for "A Resident's Guide for Creating Safer Communities for Walking and Biking".

The Federal Highway Administration just released "A Resident's Guide for Creating Safer Communities for Walking and Bicycling," a free guide offering step-by-step instructions for residents and community groups looking to improve pedestrian and bicyclist safety, access, and comfort. This webinar offers an overview of the guide and will review how two communities used the principles outlined within it to make their communities more walkable and bikeable.

Tamara Redmon, with FHWA's Office of Safety, will introduce the guide and discuss how it fits within the US Department of Transportation's Safer People, Safer Streets Initiative.

Laura Sandt, with the Pedestrian and Bicycle Information Center, will discuss the content of the new guide and how residents can use it.



PBIC Webinars and News

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The screenshot shows the PBIC website's 'Webinars' section. At the top, there is a navigation bar with links for 'Data & Resources', 'Community Support', 'Planning & Design', 'Training & Events', and 'Programs & Campaigns'. Below this, the 'Webinars' section is titled and includes a brief description of the center's offerings. A list of 'Upcoming and Recent PBIC Webinars' is provided, with three entries: 1) 'Road Signs: Ensuring Safety for All Road Users' (2/2/2015), 2) 'Bicycle Safety Guide and Countermeasures Selection System (DIRNSM13 Webinar)' (2/19/2015), and 3) 'A Resident's Guide for Creating safer Communities for Walking and Biking Webinar' (2/19/2015). Each entry lists the presenter and the topics covered.



The screenshot shows the PBIC Facebook page. The header includes the PBIC logo and the text 'Pedestrian and Bicycle Information Center' with the website URL 'www.pedbikeinfo.org'. Below the header, there is a 'Timeline' section with several posts. The first post is a status update asking 'What have you been up to?'. The second post is a link to a webinar recording. The third post is a text update about the center's role in supporting 'Ladders of Opportunity' and mentions a 'Safe Routes to School' program. The page also shows a 'Find New Customers' section and a 'PEOPLE' section with 2,225 likes.

PBIC Webinar www.pedbikeinfo.org



Pedestrian and Bicycle Information Center

Pedestrian & Bicycle Safety On & Around University Campuses



Robert J. Schneider, PhD, University of Wisconsin-Milwaukee Department of Urban Planning
PBIC Webinar—October 2015

Overview

- Fundamental reasons for designing campus streets for walking and bicycling
- Campus safety challenges
- PBIC: Campus pedestrian & bicycle safety strategies
 - Engineering, Education, Enforcement, Evaluation



PBIC Website



Pedestrian and Bicycle Information Center

Data & Resources

Community Support

Planning & Design

Training & Events

Programs & Campaigns

PLANNING & DESIGN

Planning & Data Collection Tools

Crash Data

Counts

Surveys

Inventories

Audits

Secondary Data Sources

ActiveTrans Priority Tool

Performance & Analysis

Level & Quality of Service

Intersection Safety Indices

PBCAT

Sample Policies & Plans

Sample Policies

Sample Plans

Case Studies

Resources

Funding

Government

Non-Government

Pedestrian and Bicycle Safety around University Campuses

College campuses represent unique physical and social environments within a city or a region. Many campuses have dense concentrations of activity — in classrooms, offices, research labs, dormitories, performance spaces, recreational facilities, and other locations — making walking and bicycling convenient means of travel between university buildings. Limited space for automobile parking and congested streets near universities tend to make walking, bicycling, and public transit attractive for commuting to campuses. These modes are also popular in university campus areas because students often have limited incomes and low rates of automobile ownership.



Students cross a roadway on the boundary of the University of California, Berkeley.
Photo by Robert J. Schneider

Despite having physical layouts and social environments conducive to walking and

Source: Pedestrian and Bicycle Information Center. "Pedestrian and Bicycle Safety around University Campuses," Available online, http://www.pedbikeinfo.org/planning/facilities_universities.cfm, 2015.

Quick Example: UW-Milwaukee



Social Support

Quick Example: UW-Milwaukee



Political Support

UWM Vision

“...a commitment to create a pedestrian- and bicycle/transit-oriented campus. The transportation recommendations champion a comprehensive Transportation Demand Management (TDM) approach that **prioritizes walking, cycling, and transit.**”

UWM Campus Master Plan, 2010 (p. 129)

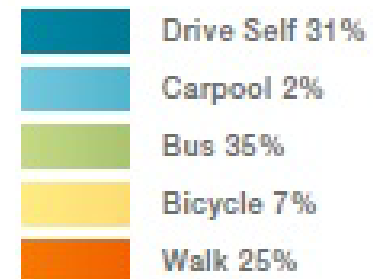
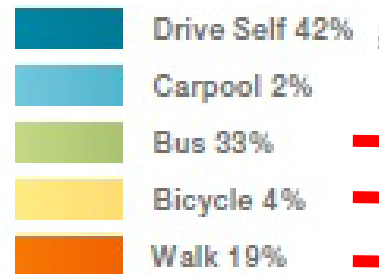


UWM seeks to increase Bicycle, Bus, and Pedestrian Commuting

Existing Kenwood Campus Student Mode Share



Future Kenwood Campus Student Mode Share Goal



Source: University of Wisconsin-Milwaukee. Master Plan Report, 2010

What's so special about university campuses?

- Major activity hubs; compact
 - Employment
 - Population
- Low auto ownership
- Young: physical condition & attitudes

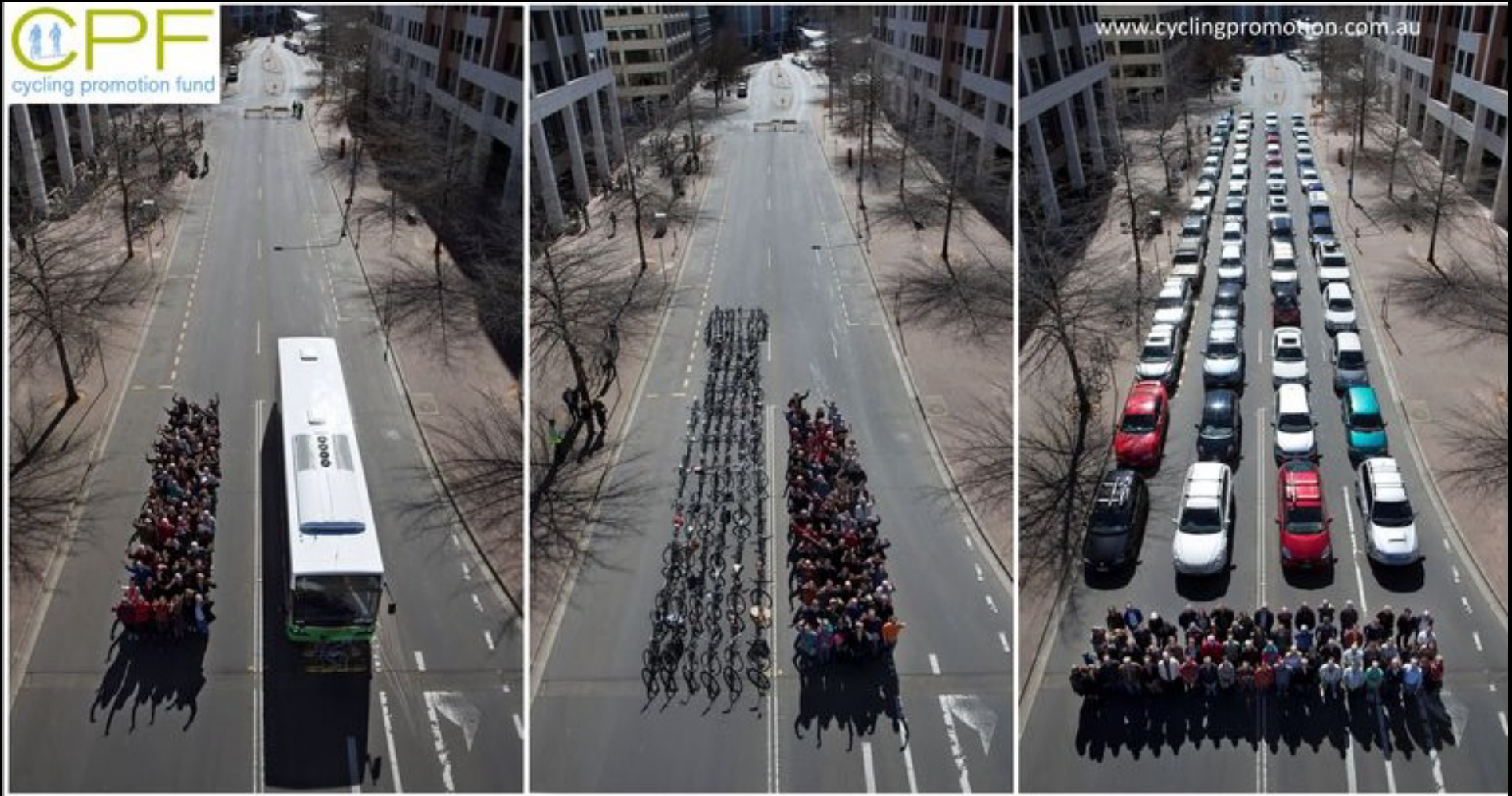


UW-Milwaukee



UC Davis

Scarce space: Pedestrians & bicyclists fit best



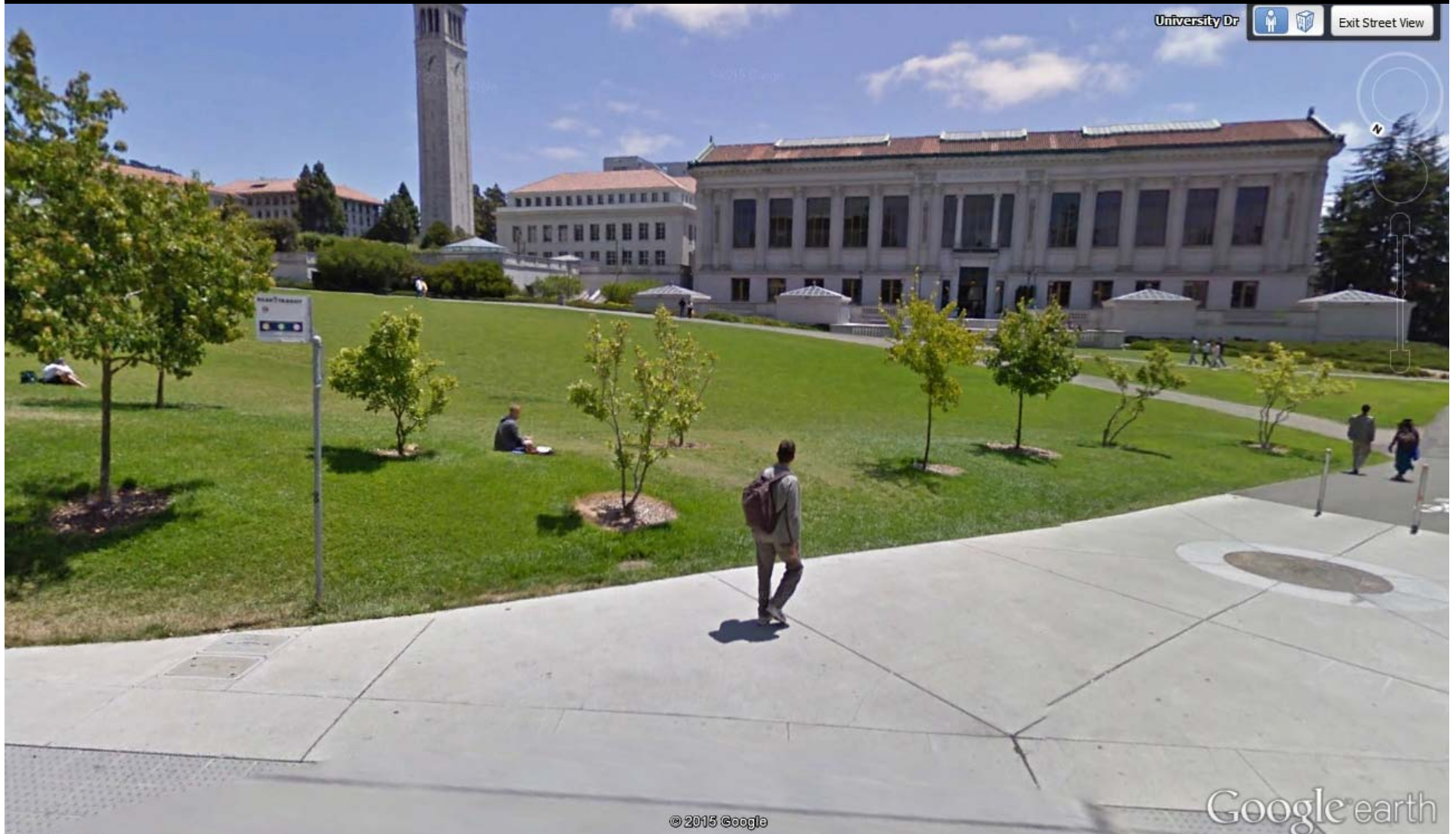
Roadway space taken up by 50 people using different types of transportation. Canberra, Australia.

Parking is limited & expensive to construct



UW-Milwaukee

Pedestrians & bicyclists help make great places



Source: Google Street View, 2015.

UC Berkeley

Pedestrians & bicyclists help make great places



UW-Madison (football Saturday)

“As universities promote active forms of transportation, it is essential to provide safe environments for pedestrians and bicyclists.”

Source: Pedestrian and Bicycle Information Center. “Background: Pedestrian and Bicycle Safety in Campus Areas,” Available online, http://www.pedbikeinfo.org/planning/facilities_universities_background.cfm, 2015.

Some still need to drive: Automobile access creates pedestrian & bicycle safety challenges



Campus Pedestrian & Bicycle Safety Issues

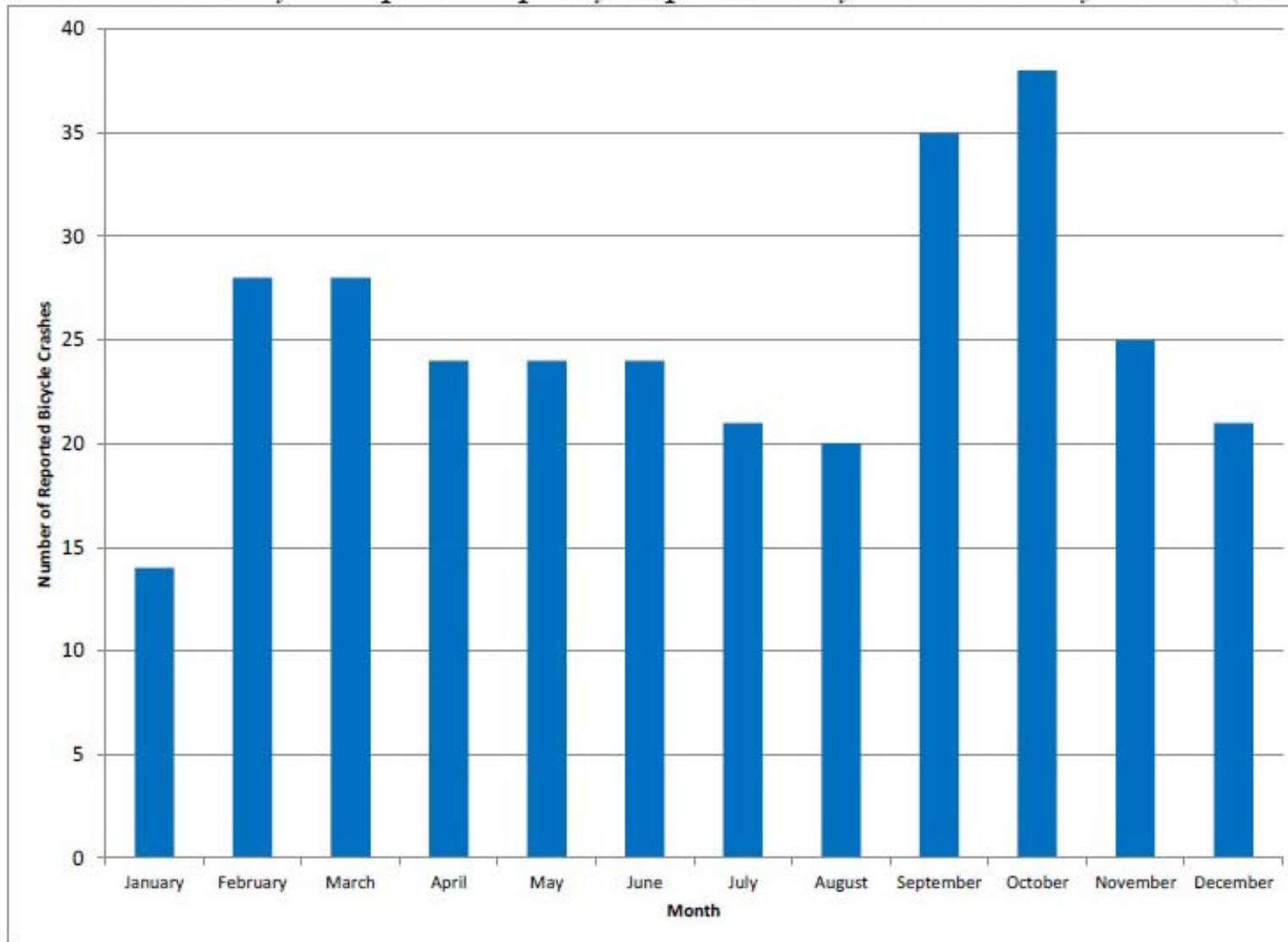
- Similarities to other areas
 - More crashes where there is more walking & bicycling, but risk is lower for each individual (“safety in numbers”)
 - Higher speeds = more severe injuries
 - Multi-lane roads = more risk
 - Common factor: intoxication
- Differences from other areas
 - Pedestrian & bicyclist mixing
 - Boundary corridors
 - Early fall (students return & new students arrive)
 - Evening = more risk; more crashes



Safety Along Campus Boundary Corridors

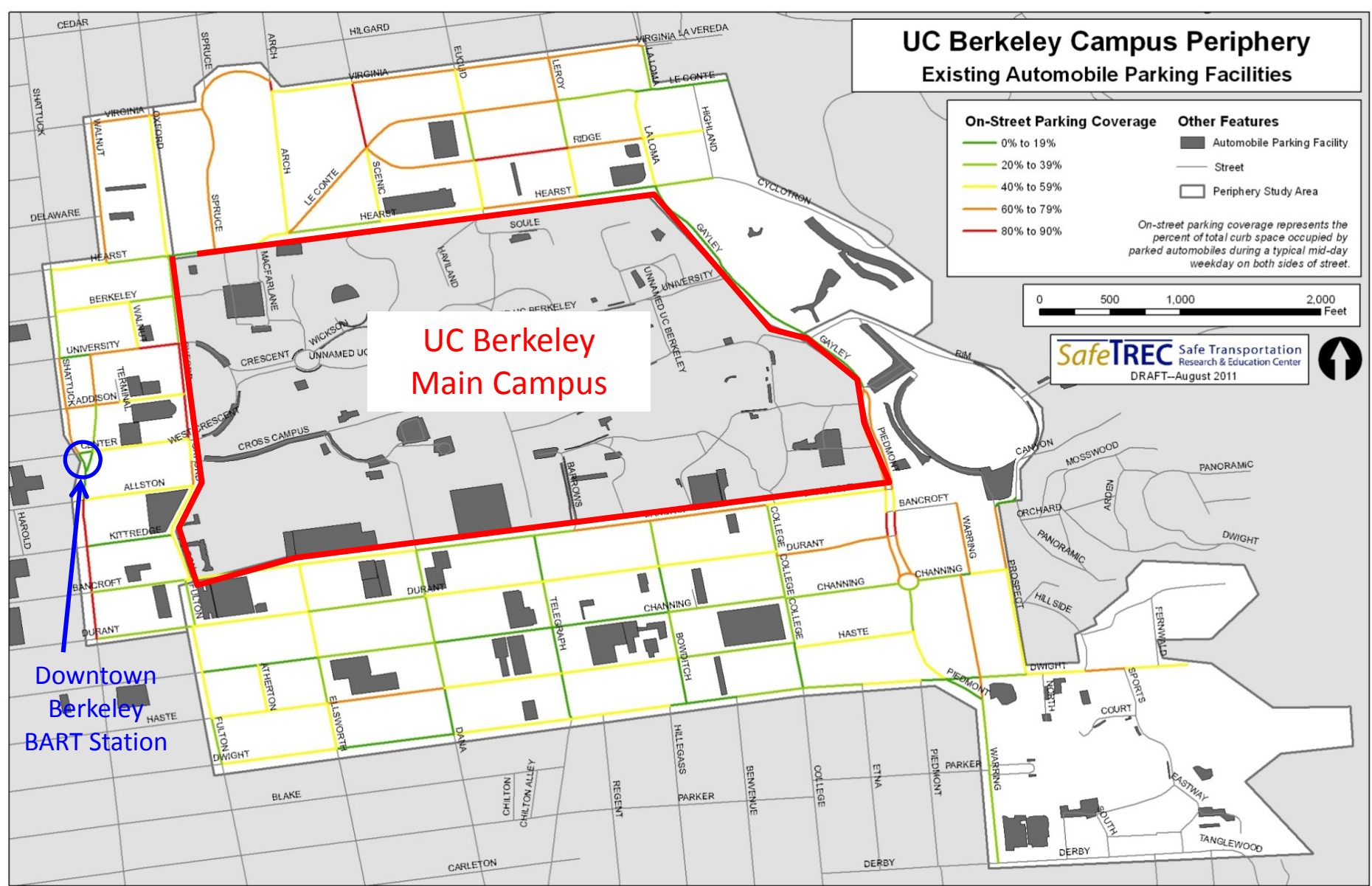
Total Number of Reported Crashes by Month over 10 Years

Figure 4.32. UC Berkeley Campus Periphery Reported Bicycle Crashes by Month (2000-2009)



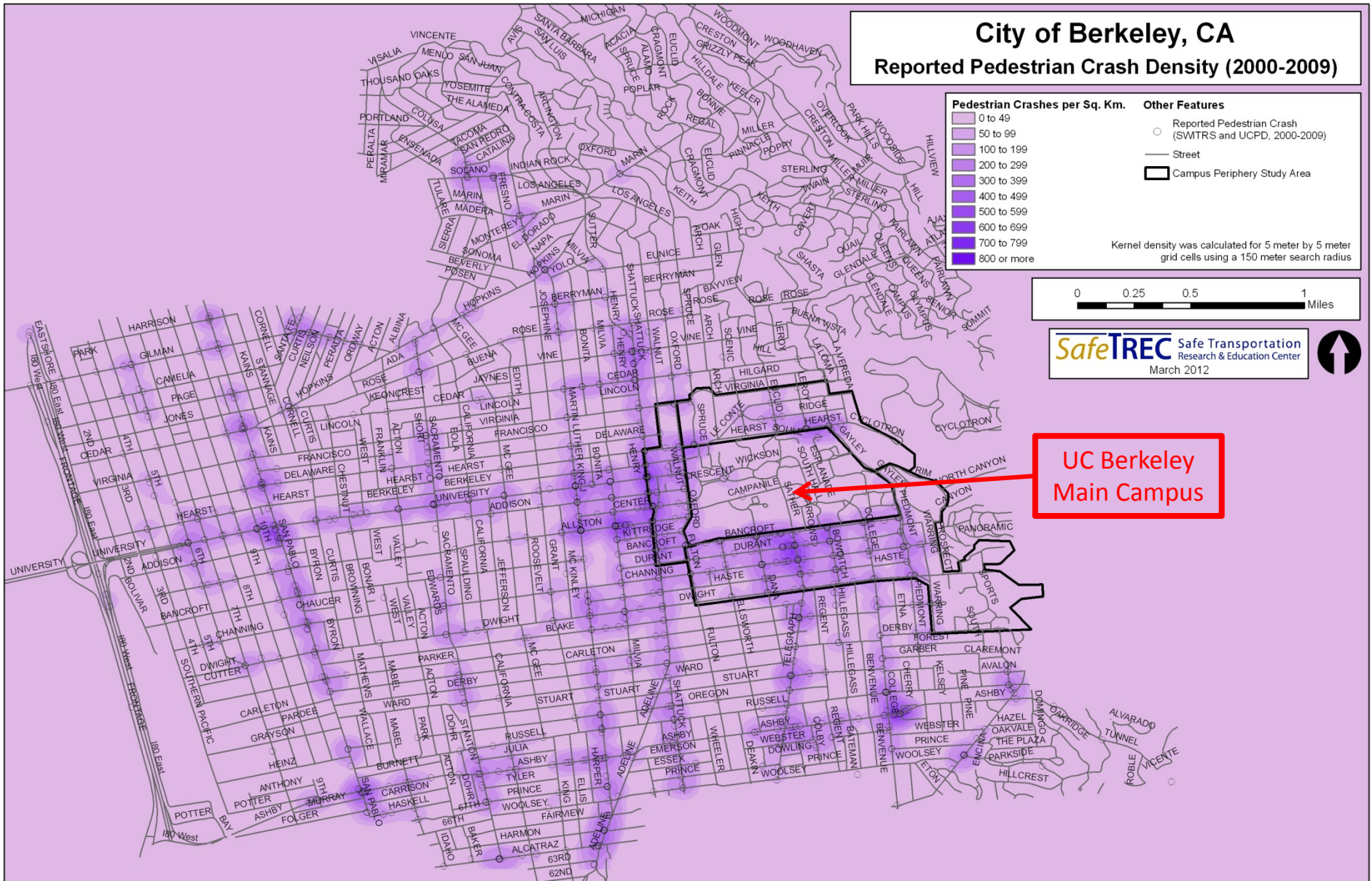
Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012

Automobile Parking on the Periphery of Campus



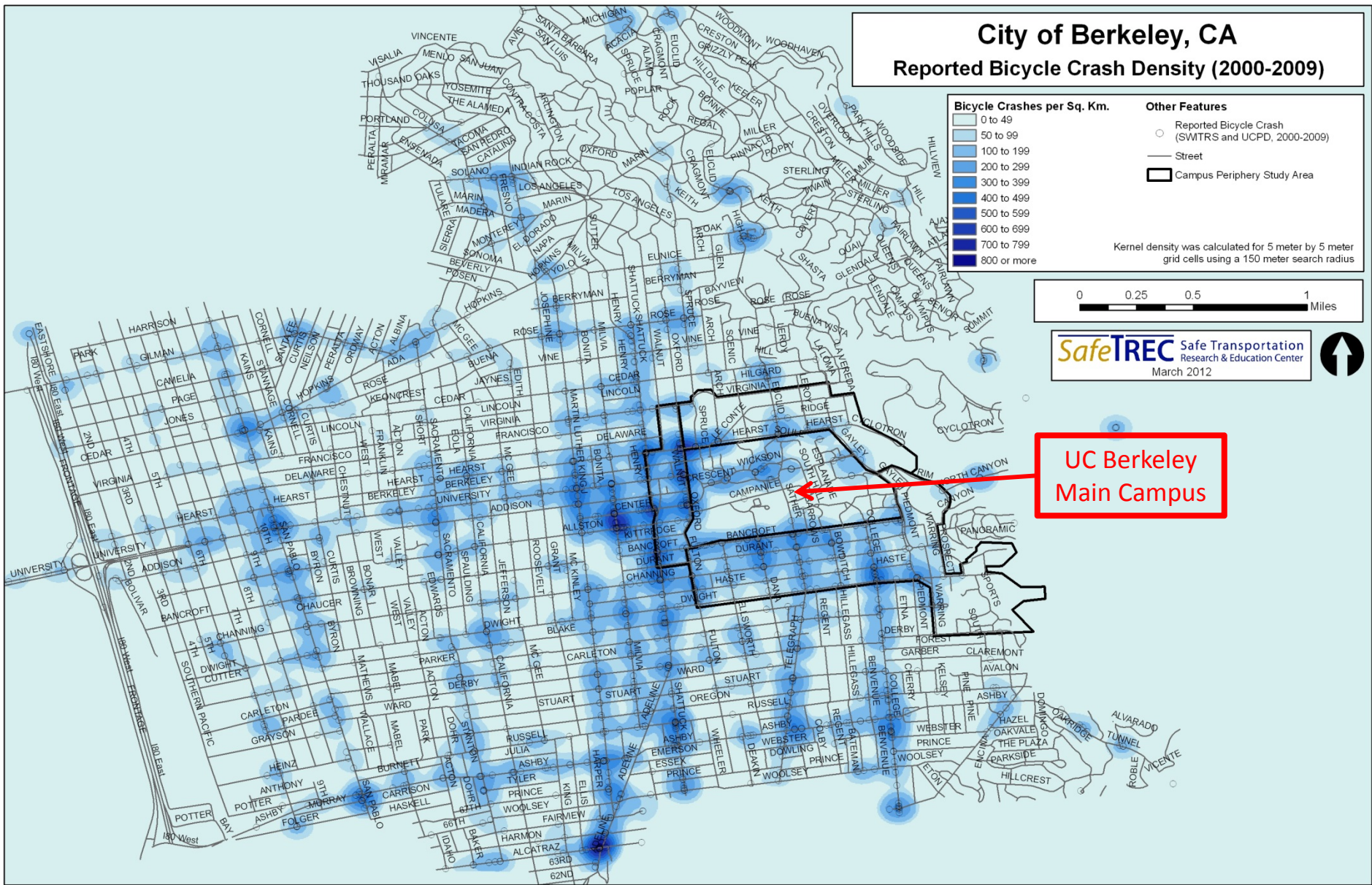
Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012

25% of Berkeley's Pedestrian Crashes Occur Near Campus



Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012

20% of Berkeley's Bicycle Crashes Occur Near Campus



Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012

Methods to Identify Campus Safety Problems

- Standard methods
 - Safety audits
 - Hot spot crash mapping
 - Crash typing
 - Expected crash estimation
- Innovative campus methods
 - Perceived risk analysis
 - Self-reported incident analysis
 - Crash rate analysis
 - Behavior observation

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Search for:
pedestrian

in
Countermeasure Name

Need Help? Search CMFs

Get training on applying CMFs
Find out about two CMF-related trainings offered through the National Highway Institute, *Application of Crash Modification Factors and Science of Crash Modification Factors*

A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site. The Crash Modification Factors Clearinghouse houses a Web-based database of CMFs along with supporting documentation to help transportation engineers identify the most appropriate countermeasure for their safety needs. Using this site, you can search to find CMFs or [submit](#) your own CMFs to be included in the clearinghouse.

Recently Added CMFs

Improve left-turn lane offset to create positive offset	Pave deteriorated shoulder (2 ft)	Conversion of signalized intersection into single- or multi-lane roundabout
CMF: 0.662	CMF: 0.93	CMF: 0.72
CRF: 33.8	CRF: 7	CRF: 28
Crash type: All	Crash type: Fixed object, Head on, Run off road, Sideswipe	Crash type: All
Crash severity: All	Crash severity: Fatal	Crash severity: Serious injury, Minor injury

Source: Crash Modification Factors Clearinghouse

Perceived Risk Analysis

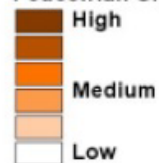
University of North Carolina at Chapel Hill Reported and Perceived Pedestrian Crash Risk

Reported Pedestrian Crash Density

UNC-Chapel Hill, 1994 to 1999



Pedestrian Crash Density

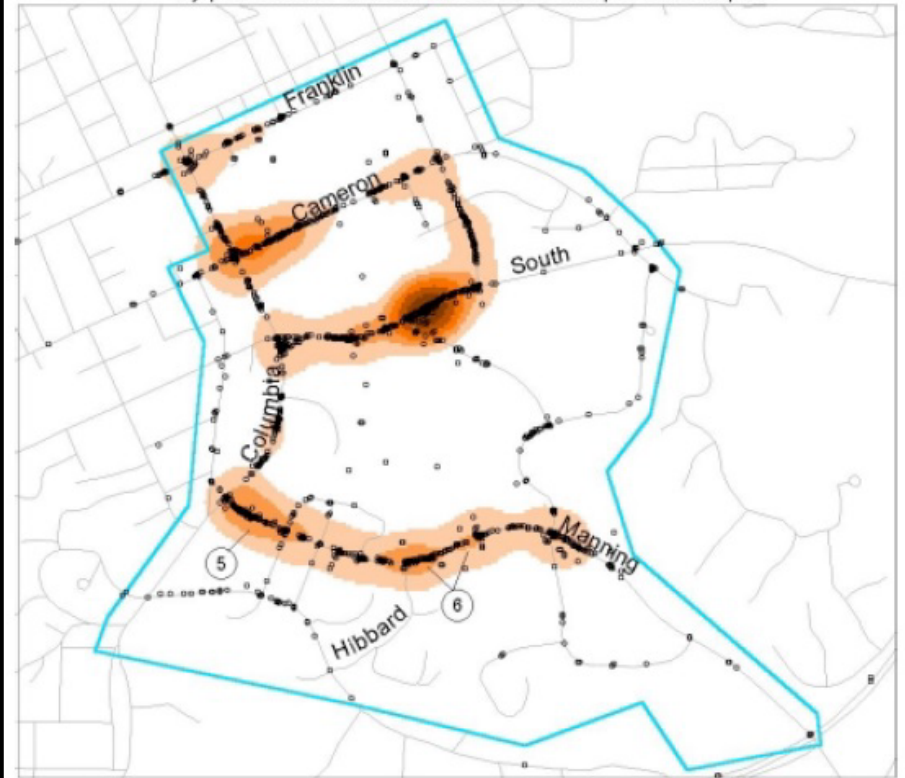


- Reported Pedestrian Crash
- Area of Campus Influence
- Street
- ① Location identified for safety treatments

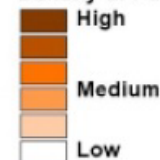
Total Campus Area Pedestrian Crashes: 57
Kernel Density Search Radius: 500 feet
Source: NC DOT Crash Reports, 10/1/94 to 9/30/99

Perception of Pedestrian Crash Risk

Locations perceived to have a high risk of pedestrian crashes by pedestrians and drivers on UNC-Chapel Hill campus



Density of Perceived Risk

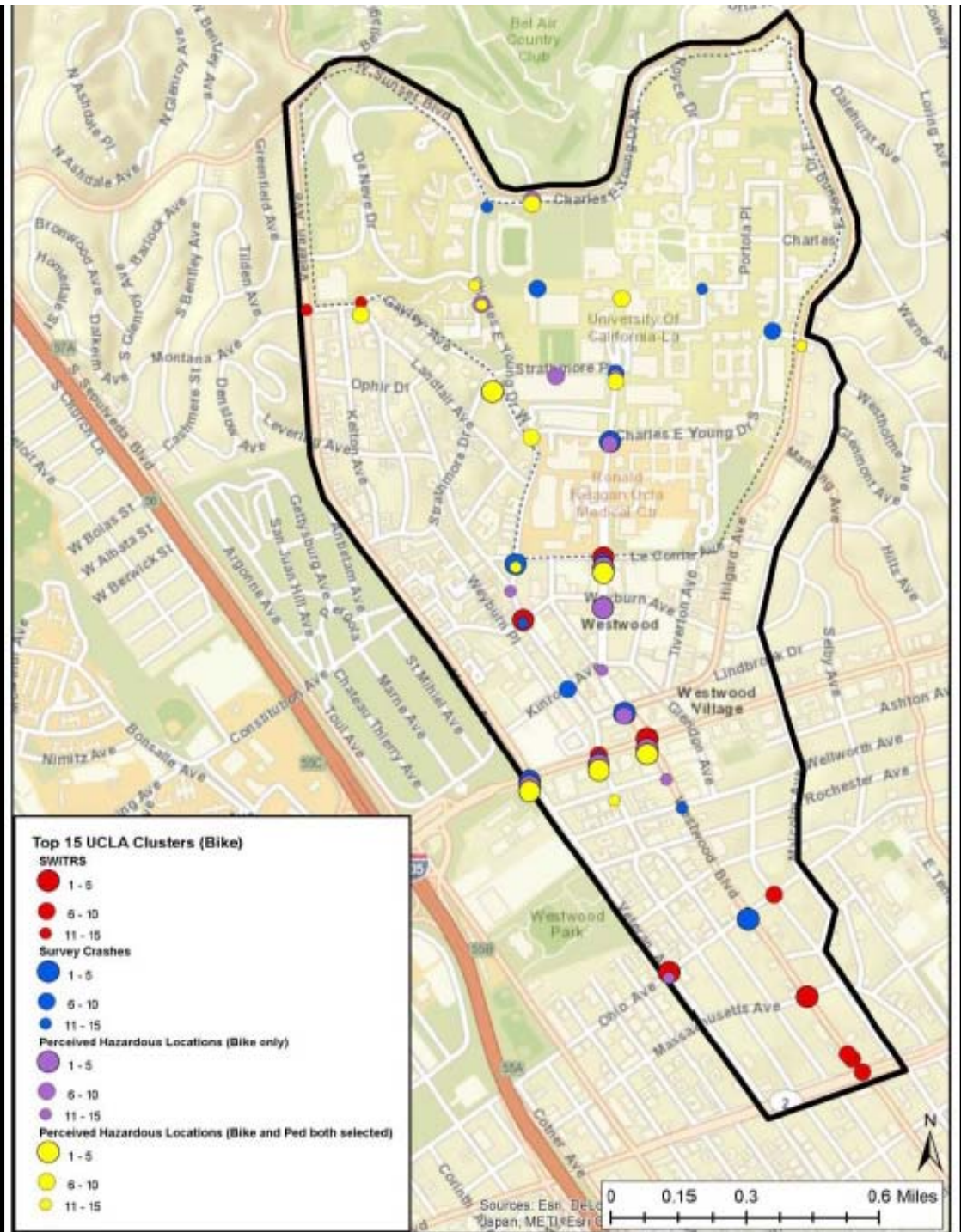


- Location Perceived as Dangerous
- Area of Campus Influence
- Street
- ⑤ Additional location identified for safety treatments

Total Campus Area Perception Locations: 1835
Kernel Density Search Radius: 500 feet
Source: UNC Pedestrian Survey and UNC Driver Survey, April 2000

Self-Reported Incident Analysis

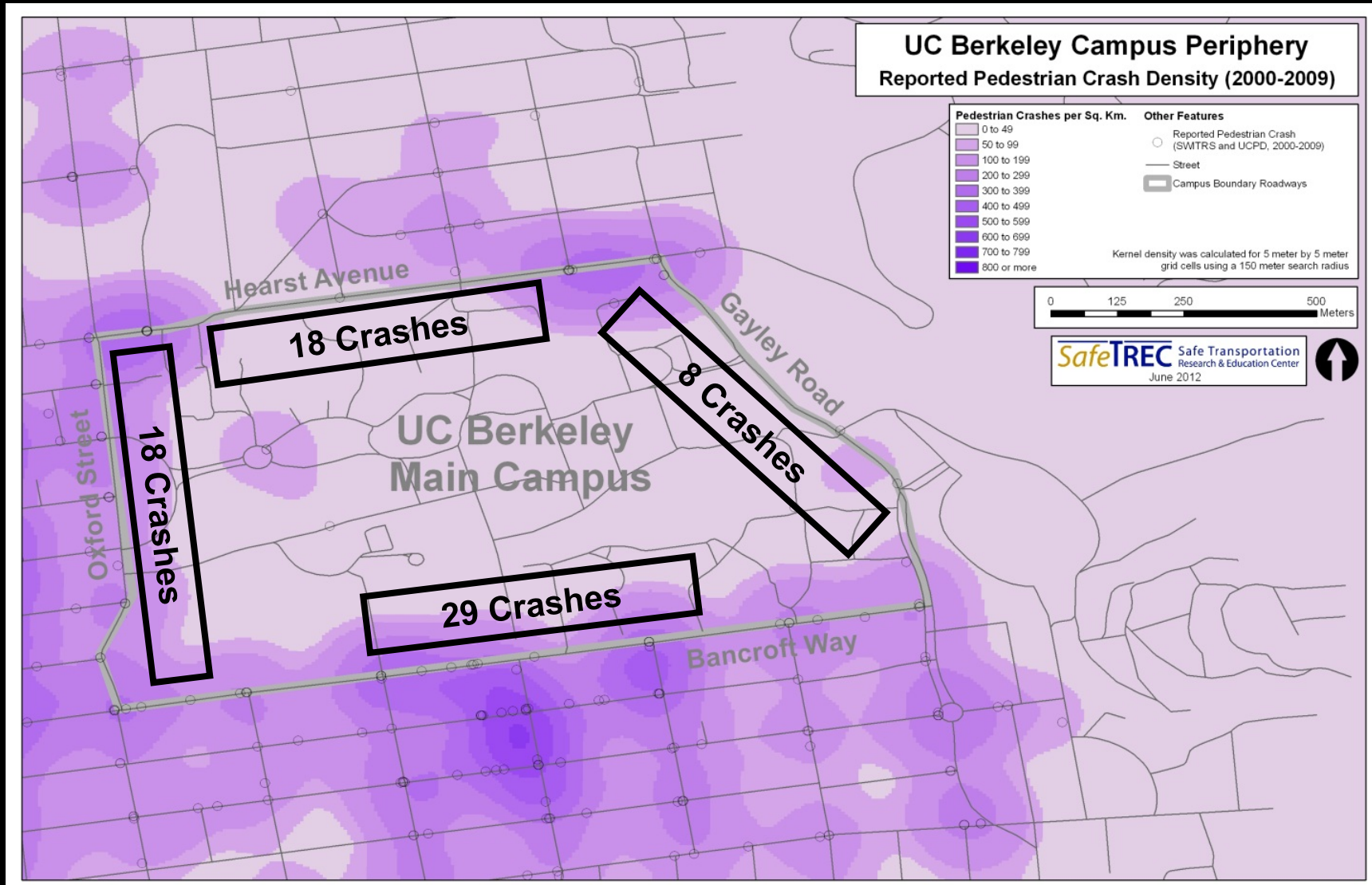
University of California, Los Angeles
 Bicycle Hot Spots identified Using
 Police-Reported Crashes, Self-
 Reported Crashes, & Locations
 Perceived to be Hazardous



Source: Grembek et al. A Comparative Analysis of Pedestrian and Bicyclist Safety around University Campuses, 2014.

Crash Rate Analysis

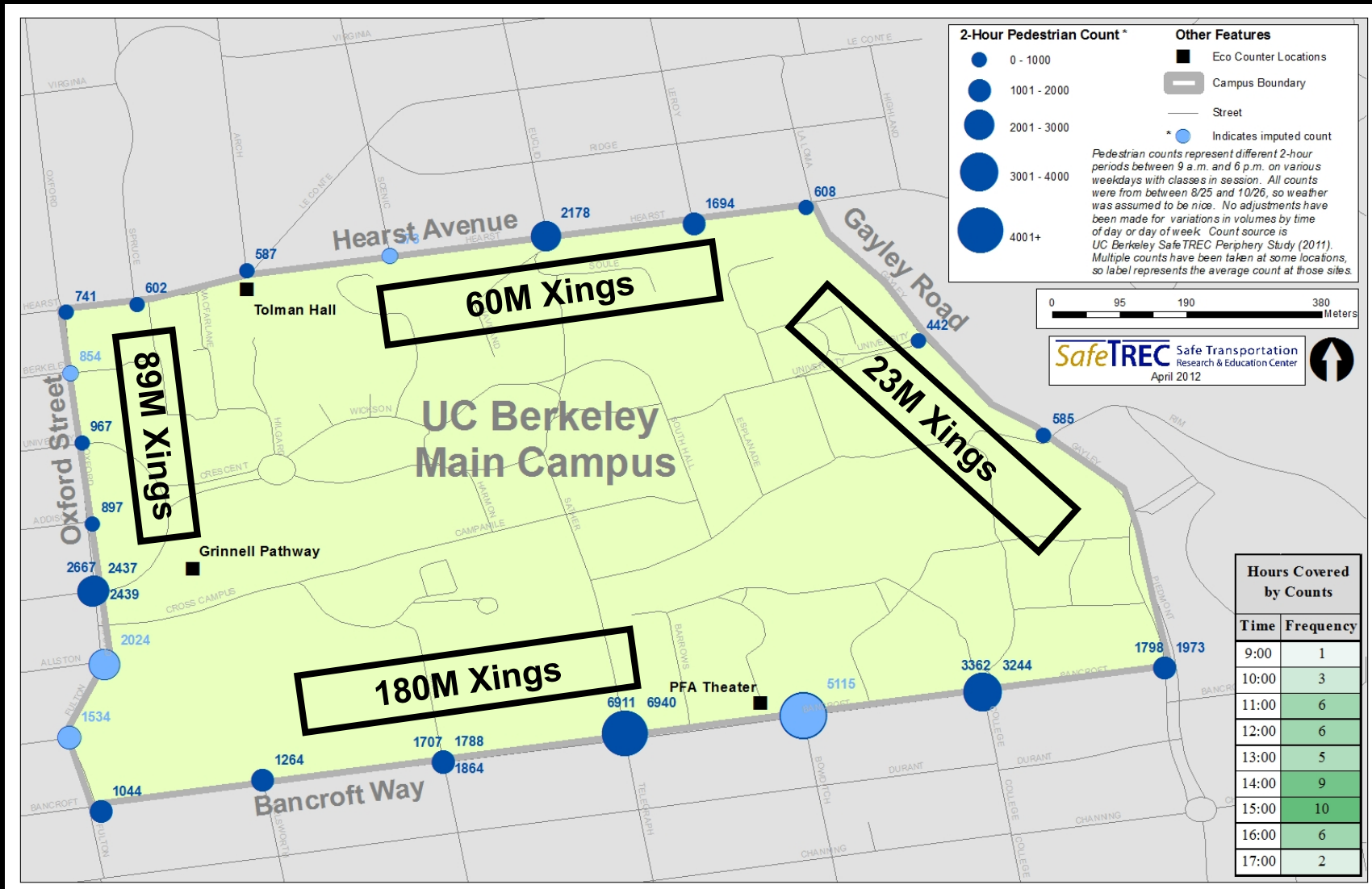
Pedestrian Crashes along Boundary Roadways (2000-2009)



Source: Schneider, R.J., O. Grembek, and M. Braughton. "Pedestrian Crash Risk on Boundary Roadways: A University Campus Case Study," Transportation Research Record: Journal of the Transportation Research Board, Volume 2393, pp. 164-173, 2013

Crash Rate Analysis

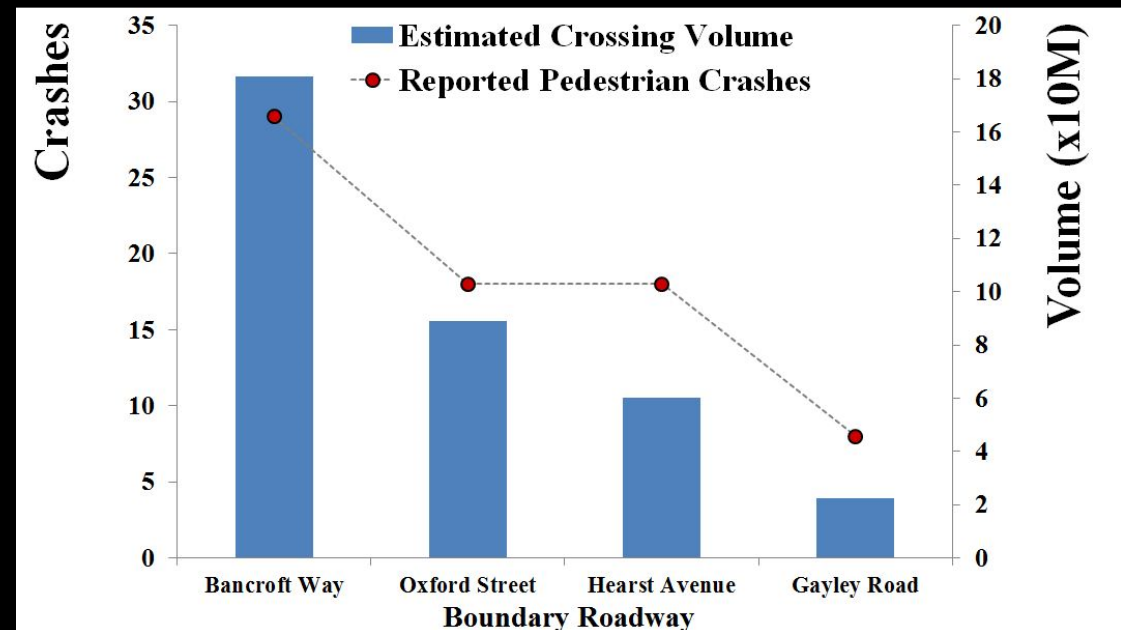
Estimated Pedestrian Crossings (10-year period)



Source: Schneider, R.J., O. Grembek, and M. Braughton. "Pedestrian Crash Risk on Boundary Roadways: A University Campus Case Study," Transportation Research Record: Journal of the Transportation Research Board, Volume 2393, pp. 164-173, 2013

Crash Rate Analysis

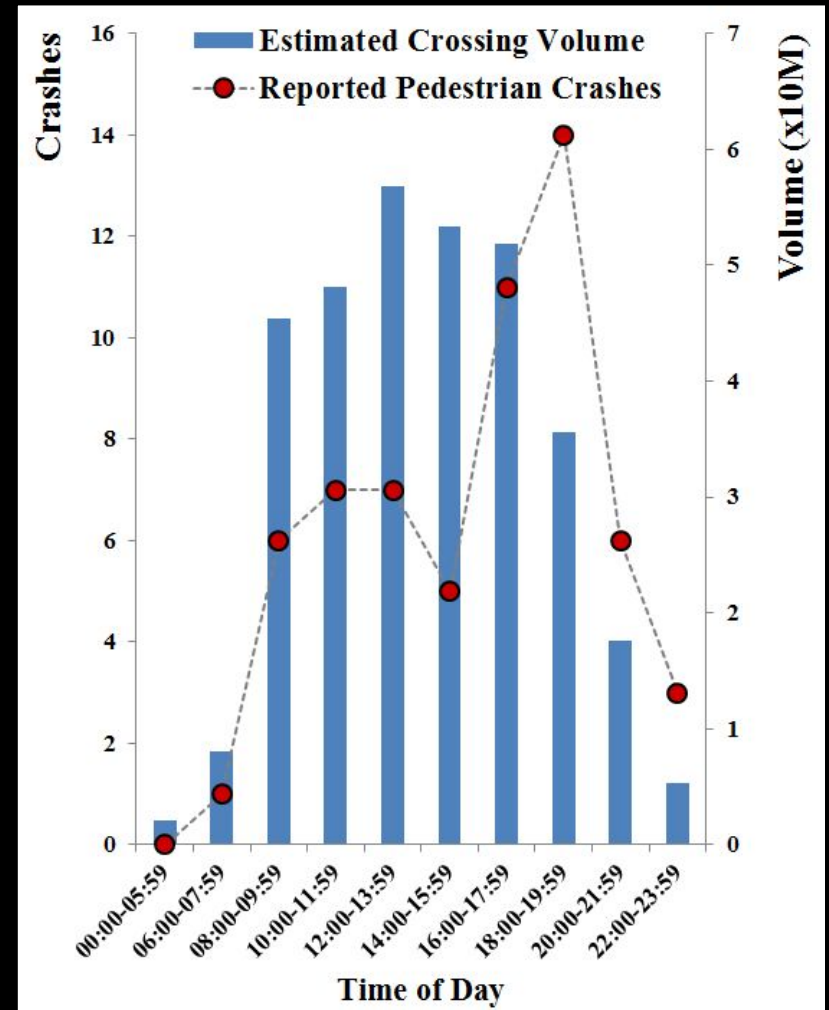
Boundary Roadway	Reported Pedestrian Crashes	Estimated Crossing Volume	Crashes/10M crossings
Bancroft Way	29	180,654,595	1.61
Oxford Street	18	89,056,477	2.02
Hearst Avenue	18	60,215,955	2.99
Gayley Road	8	22,572,373	3.54
Total	60	324,243,069	1.85



Source: Schneider, R.J., O. Grembek, and M. Braughton. "Pedestrian Crash Risk on Boundary Roadways: A University Campus Case Study," Transportation Research Record: Journal of the Transportation Research Board, Volume 2393, pp. 164-173, 2013

Crash Rate Analysis

All 22 Boundary Roadway Intersections			
Time Period	Reported Pedestrian Crashes	Estimated Crossing Volume	Crashes/10M crossings
00:00-05:59	0	2,025,899	0
06:00-07:59	1	8,025,759	1.25
08:00-09:59	6	45,451,089	1.32
10:00-11:59	7	48,181,827	1.45
12:00-13:59	7	56,791,023	1.23
14:00-15:59	5	53,333,999	0.94
16:00-17:59	11	51,804,940	2.12
18:00-19:59	14	35,643,980	3.93
20:00-21:59	6	17,638,689	3.40
22:00-23:59	3	5,345,865	5.61
Total	60	324,243,069	1.85



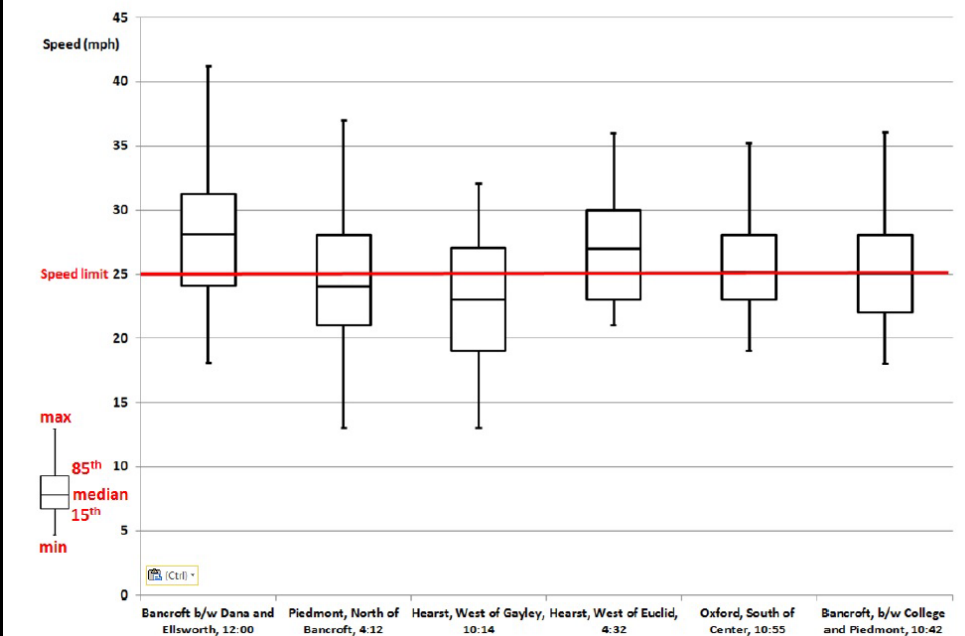
Source: Schneider, R.J., O. Grembek, and M. Braughton. "Pedestrian Crash Risk on Boundary Roadways: A University Campus Case Study," Transportation Research Record: Journal of the Transportation Research Board, Volume 2393, pp. 164-173, 2013

Behavior Observation

(Overcome limitation of infrequent crashes)

- Vehicle speeds
- Driver yielding to pedestrians
- Traffic signal compliance, including RTOR
- Pedestrians looking for traffic before crossing

Figure 4.37. UC Berkeley Campus Periphery Distributions of Vehicle Speed at Six Study Sites



Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012

Campus Engineering, Education, Enforcement, and Evaluation Strategies

Example Campus Plans Spreadsheet

PlanDesign_Facilities_Universities_Spreadsheet - Excel

Robert James Schneider

State	Plan	Plan Date	Evaluation	Education	Enforcement	Engineering/Facilities	Policy/Programs/Encouragement	Plan Link
First List: Plans								
Arizona	University of Arizona Area Bicycle and Pedestrian Plan	2012	<ul style="list-style-type: none"> U of A has <u>recommended the installation of automated bicycle and pedestrian counters</u> to augment its network gap analysis evaluation program. The U of A receives bicycle and pedestrian counts for on-campus network from the Pima Association of Governments. They then use this data to <u>conduct a Bikeway and Pedestrian network gap analysis that covers spot, connectivity, lineal, corridor, bike boulevard and pedestrian deficiencies</u> or 	<ul style="list-style-type: none"> The University of Arizona Police Department (UAPD) conducts a <u>Bicycle Safety and Education Campaign</u>. This campaign involved educating community members on bicycle traffic laws, bicycle safety, and how to prevent bicycle theft. Throughout September, officers and volunteers intercepted bicyclists at campus locations and provided them with a "Share the Road" guide with information on how to share the road with motorists. Pima County publishes 	<ul style="list-style-type: none"> <u>Student community service officers assist the University of Arizona Police Department</u> with detection of criminal activity. This position is ideal for the enforcement of bicycle and pedestrian violations on campus. Students can patrol by foot or by bike and enforce violations, such as wrong way riding, speeding, illegal crossings, and improper bicycle parking. Since community service officers are also students, this is a way to 	<ul style="list-style-type: none"> The U of A plan recognizes the need to <u>coordinate with surrounding municipalities and agencies to meet its plan's objectives of increasing both safety and bicycle and pedestrian mode share</u>. As such, it divides the plan's focus into four zones: 1-On-campus, walkway and bikeway solutions; 2- Pedestrian-oriented treatments within one quarter mile of campus; 3-Bikeway and network improvement zone; 4- Regional programmatic improvements (education, 	<ul style="list-style-type: none"> The University of Arizona offers a <u>free, voluntary bicycle registration program</u>. Registered bicycles are provided a unique identification number, which is placed on the bicycle and may help to prevent theft. If registered bicycles are stolen, the police have a number to trace the bike back to the owner. If a bicyclist has registered his/her bicycle with the University and loses the key to his/her bike lock, Parking and Transportation Services will remove the lock 	https://parking.arizona.edu/alternative/documents/UAAreaBikePedPlanFinalAugust2012.pdf
California	University of California, Berkeley	2013	<ul style="list-style-type: none"> The plan recommends that UC Berkeley collect data on ped/bike infrastructure, activity, behavior and safety not only on campus but in the campus periphery and at important exchange points. It specifically details actions to make this data collection possible: <u>1- purchase and install four pedestrian and four bicycle automatic counters</u>. These will be placed at entrances across campus, and in the pavement at primary bicycle routes to and from campus 	<ul style="list-style-type: none"> The plan recommends instituting a <u>"Bear Crossing" pedestrian safety campaign</u>. This program involves the campus police and city police providing safety information to motorists and pedestrians at crosswalks near the UC Berkeley campus, providing pedestrian safety bumper stickers, and broadcasting pedestrian safety messages through the local media. The plan recommends <u>integrating pedestrian, bicyclist, and driver safety</u>. 	<ul style="list-style-type: none"> UC Berkeley wants to step up enforcement of pedestrian and bicycle related laws in and around campus. The city of Berkeley <u>Police Department has conducted Pedestrian Safety Month enforcement and education activities</u> for three years. Patrol officers are updated on pedestrian laws before the month, and display purple ribbons on patrol cars during the month. The department identifies problem intersections and locales with crash data, and targets enforcement at 	<ul style="list-style-type: none"> The plan identifies reducing automobile traffic speeds to less than 25mph on campus and near campus as a main goal. This would entail a combination of engineering treatments like reducing travel lane widths and installing curb extensions; with posted speed limits and traffic enforcement in targeted zones. UC Berkeley currently <u>limits internal automobile access</u> and its east and west gates to permit only traffic between 8AM 	<ul style="list-style-type: none"> The plan recommends <u>pilot testing targeted pedestrian and bicycle encouragement messages, intended to increase awareness of traveling by non-automobile modes among members of the college</u>. It would include individualized messages in brochures, email messages and other media resources about walking, bicycling and using public transit to commute to and from campus. Regular driving commuters could be offered a 	http://safetrec.berkeley.edu/sites/default/files/Pedestrian-Bicycle-Safety-for-UC-Berkeley-Campus-and-Periphery.pdf
California	University of California, Davis	2011	<ul style="list-style-type: none"> <u>Annual campus travel assessment survey</u>: Survey being developed that will answer the following questions and will be helpful in future bike planning at UC Davis: 1. How does the campus community get to campus?; 2. What transportation-related programs are they using? 3. What are the main barriers for people to walk, bike, and bus more to get to campus?; 4. Are people trying to make a difference through their 	<ul style="list-style-type: none"> <u>Informational UC Davis Bike Map: Distributed freely</u>. It is a two sided document, one side with bicycle relevant information, the other with the map. The map side of this document depicts all the bikeways in the city and on campus, including all streets marked with bike lanes. It also shows bike shop locations, tire air sources, and a variety of other features of interest or use to bicyclists. The reverse side 	<ul style="list-style-type: none"> <u>Dedicated Bike Patrol officers</u>: University Police are authorized to enforce all bicycling rules and regulations on campus. The department <u>currently has four officers who have received standard bicycle patrol training. They have fully-equipped police bikes and the requisite accessories and uniforms</u>. As staffing and events allow, the goal is to have significant coverage of the campus by at least one officer on bicycle at 	<ul style="list-style-type: none"> <u>Wide bike lanes</u>: UC Davis has large volumes of bicycle infrastructure, including bike paths, bike lanes, and bike ways. The plan states that almost all are wider than minimum AASHTO standards and Caltrans Highway Design manual standards. <u>When designing new bikeways, they err on the side of too wide with the expectation of increasing future bicycle volumes</u>. All bike 	<ul style="list-style-type: none"> <u>ASUCD Bike Barn</u>, which for over thirty years has provide a centralized source of bicycles, parts, service, accessories, repair, maintenance and a place where Aggies can work on their own bikes by making use of the Barn's tool loan service. <u>The Davis Bike Church</u>, a campus organization, provides self-service bike repair and repair instruction. They also refurbish bikes for use in the community and 	http://taps.ucdavis.edu/sites/taps.ucdavis.edu/files/attachments/BikePlanUCDCampus2011.pdf

(Details compiled by Jake Thirsk, UNC Highway Safety Research Center)

Source: Pedestrian and Bicycle Information Center. "Pedestrian and Bicycle Safety around University Campuses," Available online, http://www.pedbikeinfo.org/planning/facilities_universities.cfm, 2015.

Engineering



UC Berkeley



UW-Madison

Engineering



UC Davis



UC Berkeley

Engineering



Engineering: Understand which agency is responsible



Source: Google Street View

Education



Safety Education Posters produced by Champaign County Bikes in partnership with Facilities & Services

Education

- “Captive” audience for safety messages
- Opportunities to emphasize pedestrian safety
- Innovative examples
 - Incorporate pedestrian & bicycle safety into orientation
(University of Arizona; UC San Diego; UC Berkeley; University of Illinois, Urbana-Champaign; University of Maryland, College Park; Clemson University)
 - Offer a bicycle safety course for credit (Portland State University)
 - Offer bicycle maintenance and repair classes
(UC Davis; University of Utah)
 - Conduct a pedestrian and bicycle safety campaign through social media (University of Illinois, Urbana-Champaign)
 - Encourage students and other citizens to report unsafe pedestrian conditions to a website or phone hotline
(Wake Forest University)

Enforcement

- Innovative examples
 - Purple ribbons on patrol cars = Pedestrian Safety Month & increased enforcement (UC Berkeley & City of Berkeley Police)
 - Dedicated bicycle patrol officers for pedestrian- & bicycle-related laws (UC Davis; UC San Diego, UNC-Greensboro, Clemson University)
 - Increase penalties for pedestrian- & bicycle-related infractions: warnings at the beginning of school year; tickets later (University of Illinois, Urbana-Champaign)



Evaluation

- **Infrastructure** (e.g., Sidewalks, Bulbouts, Crossing distance)
- **Activity** (Annual pedestrian counts, Continuous counts, Mode share)
- **Behavior** (Motor vehicle speed, Yielding, Pedestrian signal compliance)
- **Safety** (Reported crashes & injuries, Crash & injury rates)



Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, 2012.

Evaluation

- **Infrastructure** (e.g., Sidewalks, Bulbouts, Crossing distance)
- **Activity** (Annual pedestrian counts, Continuous counts, Mode share)
- **Behavior** (Motor vehicle speed, Yielding, Pedestrian signal compliance)
- **Safety** (Reported crashes & injuries, Crash & injury rates)



Thanks!



For more information about Campus Pedestrian & Bicycle Safety, see:
http://www.pedbikeinfo.org/planning/facilities_universities.cfm

**Pedestrian and Bicycle Safety Strategies for
UC Berkeley Campus and Periphery:
Recommendations for Implementation**

FINAL DRAFT—May 2012



“Pragmatic” Recommendations

UC Office of Risk Services

- Andrew Goldblatt

UC Berkeley SafeTREC

- Robert Schneider
- Offer Grembek
- Matthew Braughton
- Phyllis Orrick
- David Ragland

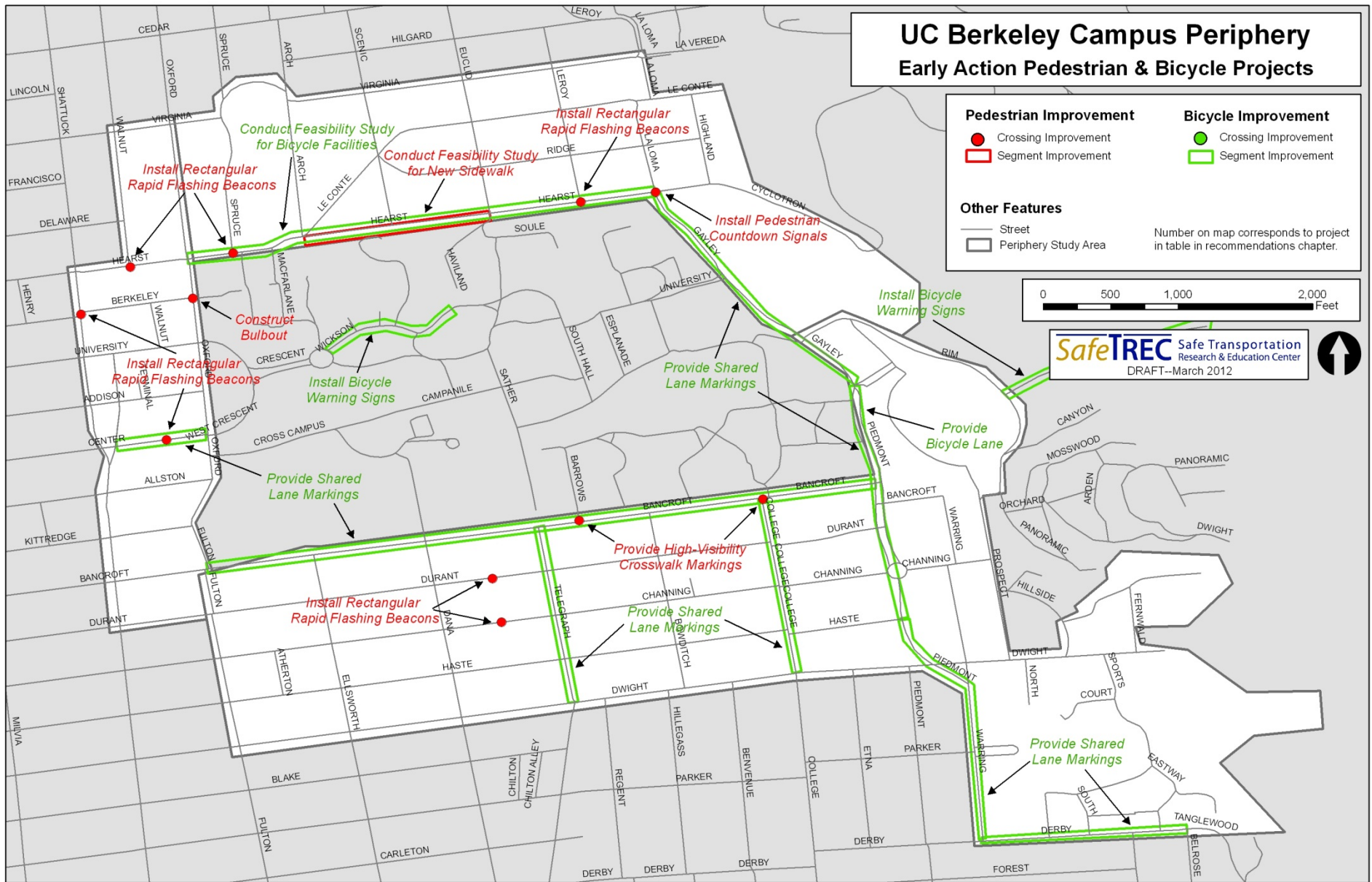
Key Consultation on Project

- Eric Anderson, City of Berkeley Transportation Division
- William Riggs, UC Berkeley Office of Physical and Environmental Planning

Report is available online:

<http://safetrec.berkeley.edu/content/campus-periphery-recommendations>

"Early Action" Projects

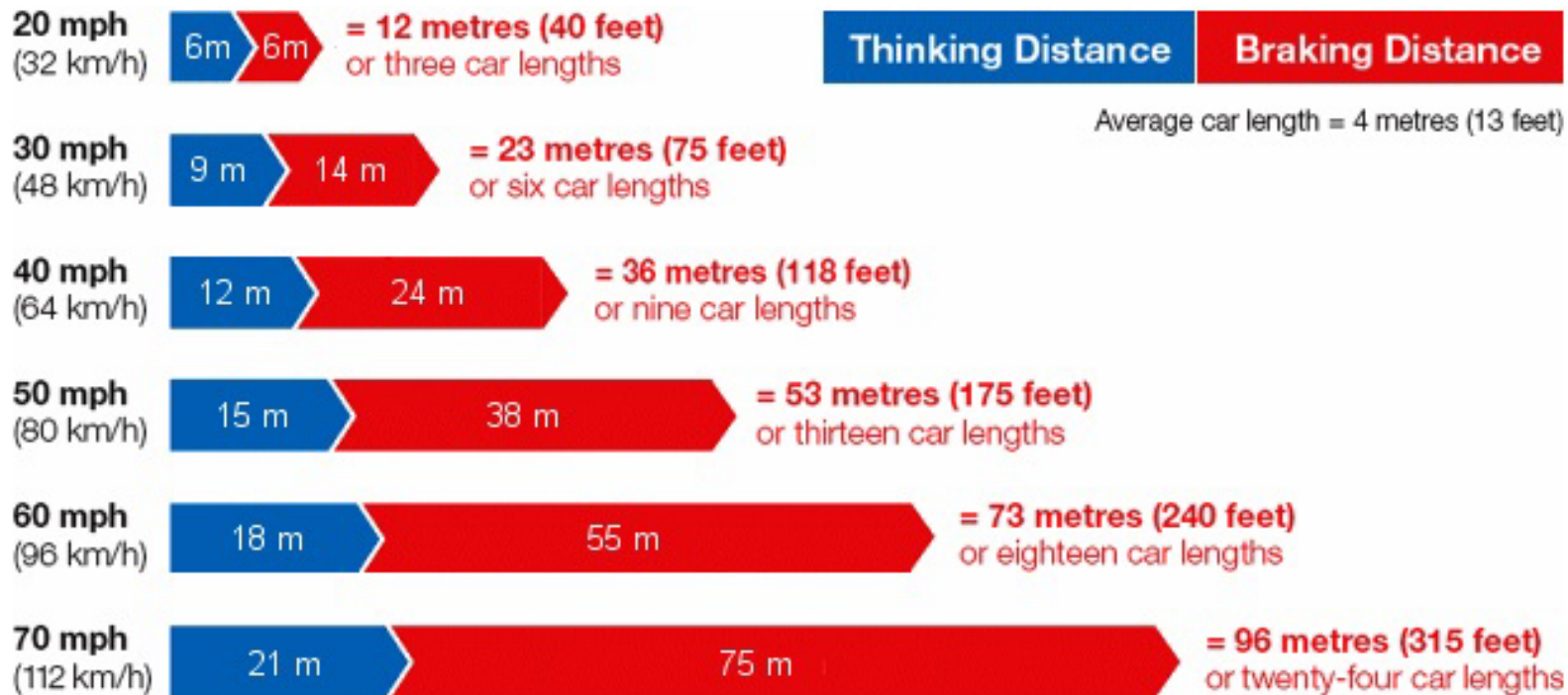


Source: Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation

Slow speeds: Safer for human-powered modes

What is the braking and stopping distance at...

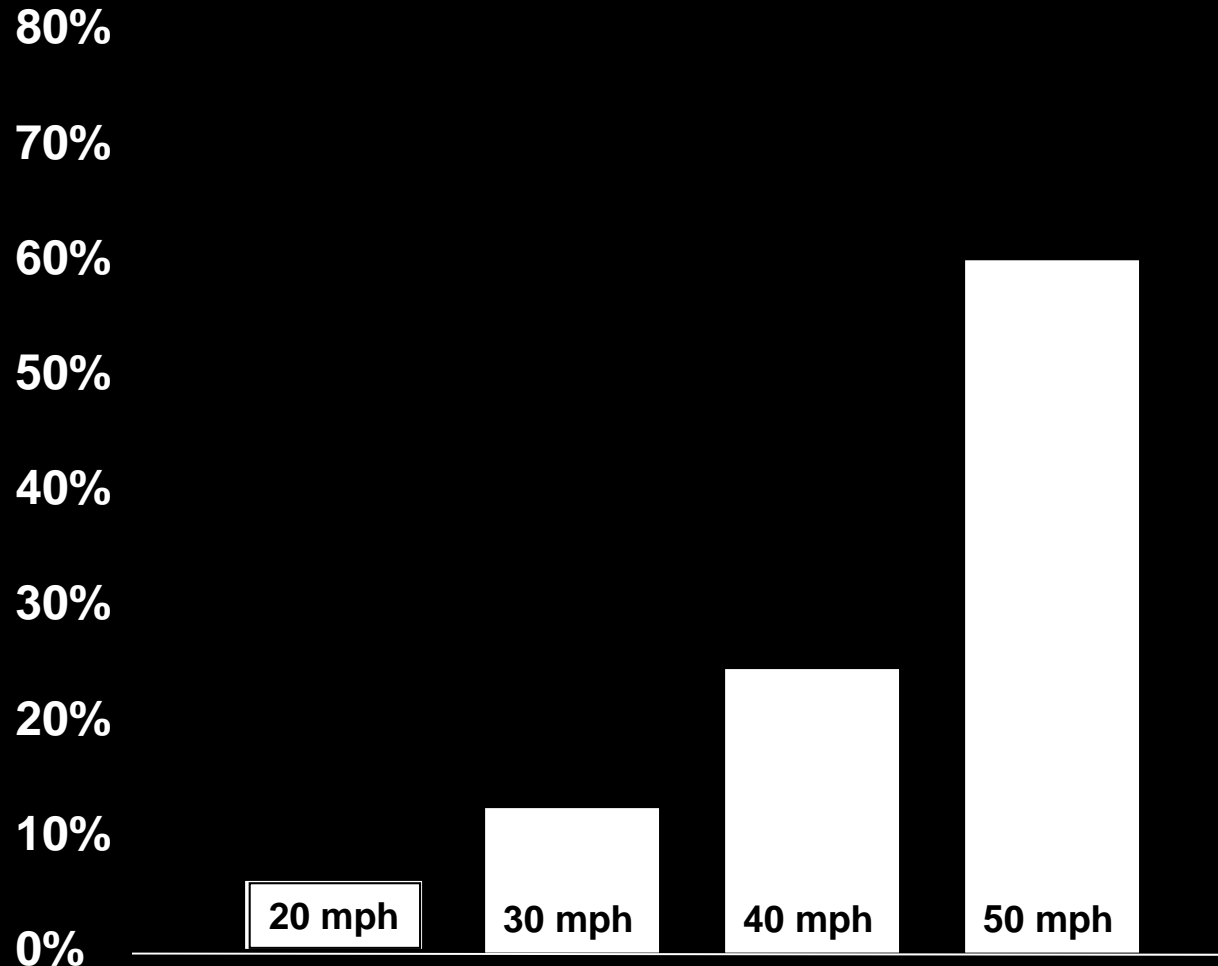
The diagram below shows the typical stopping distance. The distances shown are a general guide and will depend on your attention (thinking distance), the road surface, weather conditions and the condition of your vehicle.



Source: www.drivingtestsuccess.com, 2013 (United Kingdom)

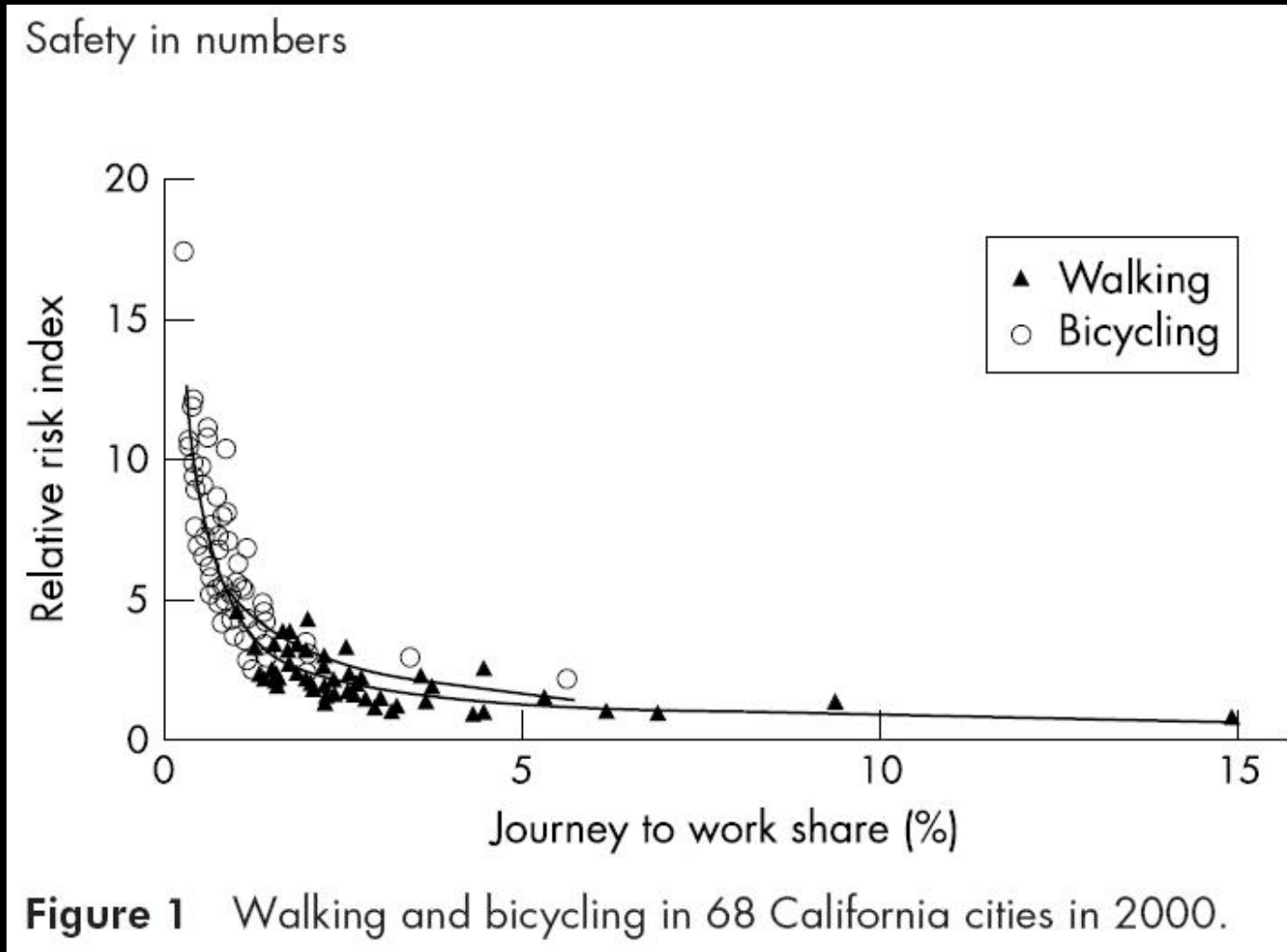
Fatalities Based on Speed of Vehicle

A pedestrian's chance of death if hit by a motor vehicle



Rosén, E, H. Stigson, and U. Sander. "Literature review of pedestrian fatality risk as a function of car impact speed," *Accident Analysis and Prevention* 43, pp. 25-33, 2011.

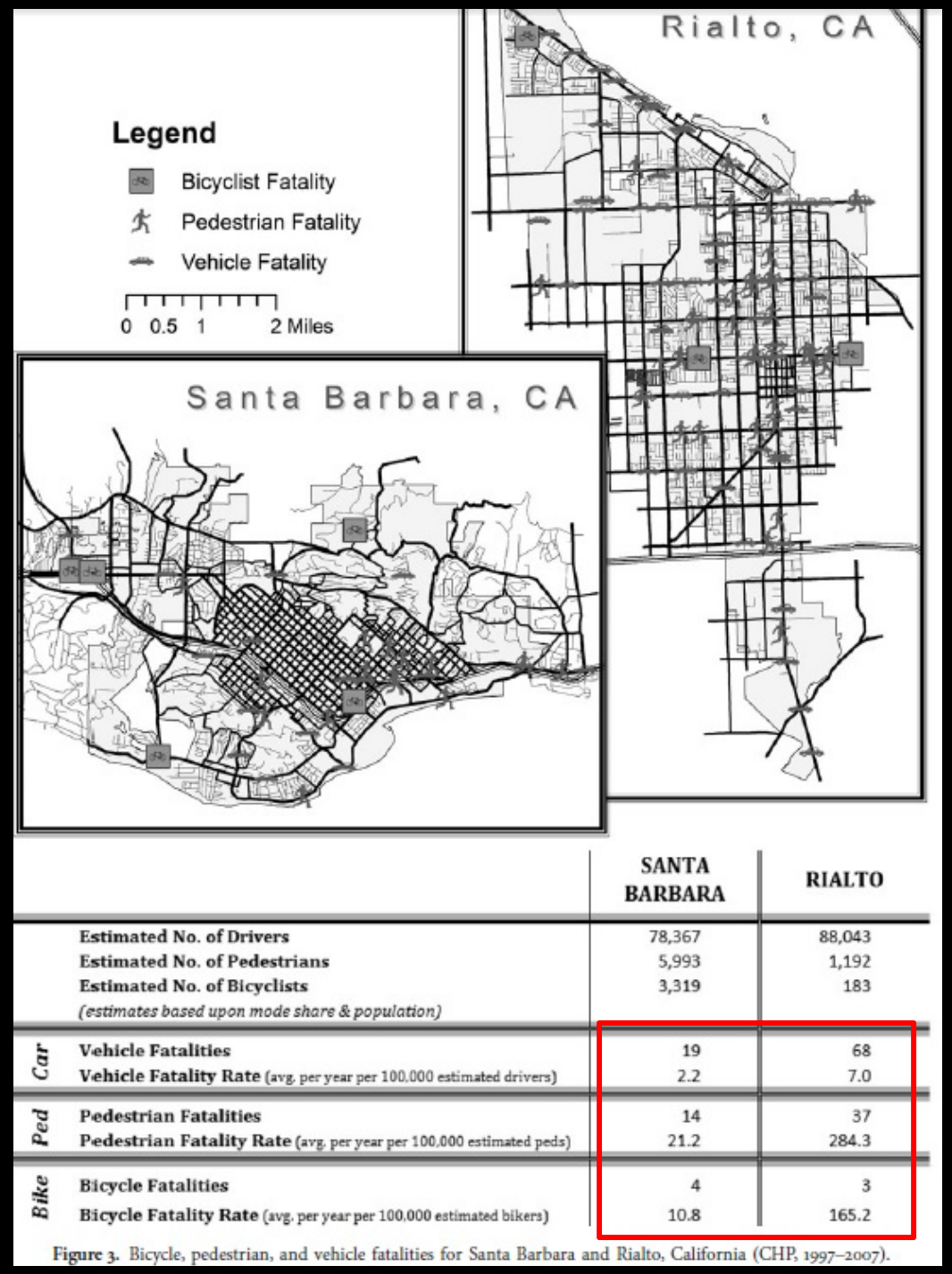
More walking & biking: Safer for each person



“A community doubling its walking (increase by 100%) can expect a 32% increase in injuries.” (less than 100% increase)

Source: Jacobsen, P. “Safety in numbers: more walkers and bicyclists, safer walking and bicycling,” Injury Prevention, Volume 9, Issue 3, pp. 205-209, 2003.

More walking & biking:
Safer for each person
(auto drivers & passengers, too)



Source: Marshall, W.E. and N.W. Garrick. "Evidence on Why Bike-Friendly Cities are Safer for All Road Users," Environmental Practice, Volume 13, Number 1, pp. 16-27, 2011.

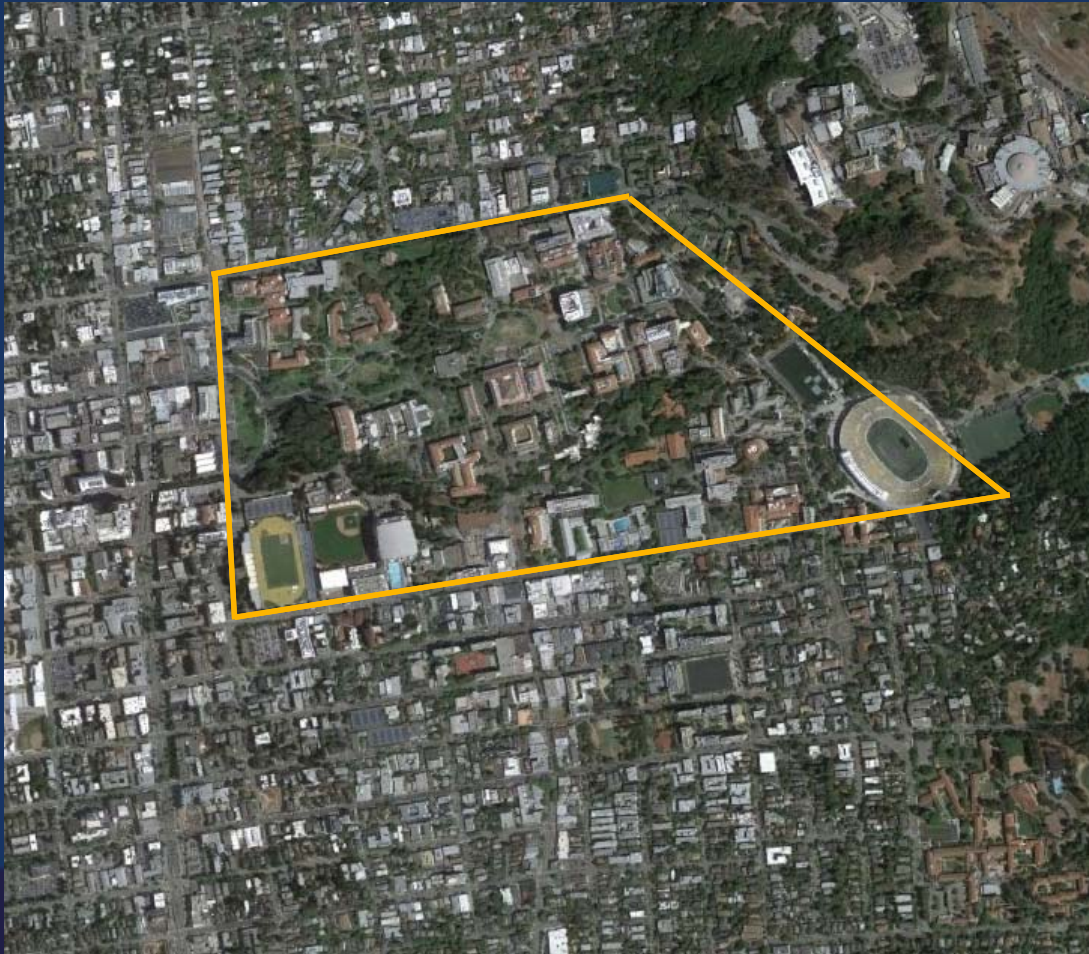
UC Berkeley

Pedestrian and Bicyclist Safety at the Campus Edges

16 October 2015

Todd Henry, UC Berkeley Physical & Environmental Planning

Berkeley Campus | Basics



178 acre “Campus Park”
~10M sq feet built space
1,232 acre campus

Faculty/Staff: 15,000
Students: 35,000

Berkeley Campus | Basics

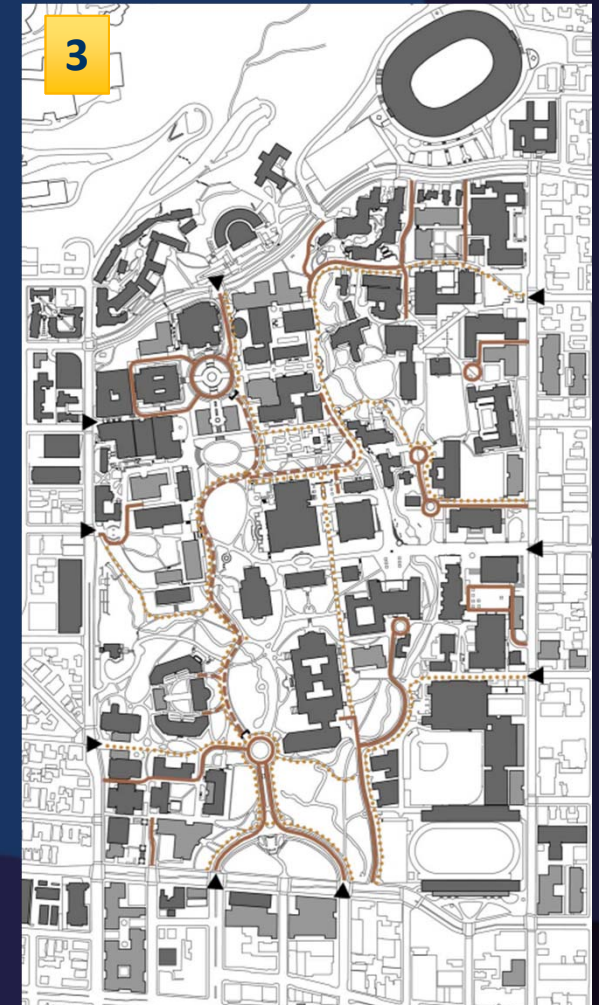
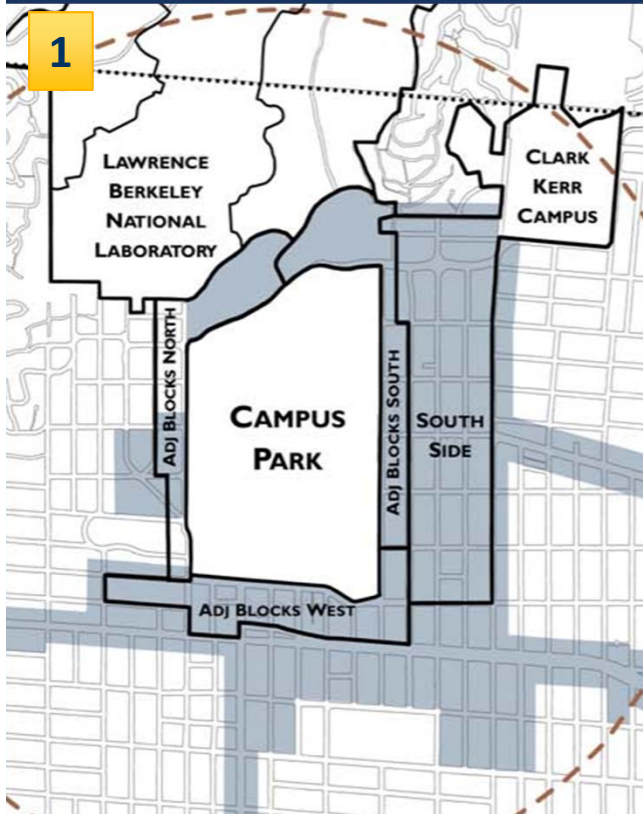


178 acre “Campus Park”
~10M sq feet built space
1,232 acre campus

Faculty/Staff: 15,000
Students: 35,000

Primary Planning Frameworks

1. Long Range Development Plan – Land Use, Population, Infrastructure, Design, Environment
2. Landscape Master Plan – Design, Place, Circulation
3. Bicycle Master Plan – Circulation, Infrastructure



On-Campus Challenges





Off-Campus Challenges



Off-Campus Challenges

Transportation Project Development

- Long-Range Development Plan / TDM Funding Agreement w/ City of Berkeley
 - Projects that mitigation transportation impacts of campus growth on neighbors
 - Joint projects around the periphery of campus
 - 5-year expenditure plans approved by City and Campus
 - Used as leverage/local match for larger grants
- Project-based implementation
 - LRDP asks that all projects consider access, particularly bike and pedestrian access
 - All projects required to install bike parking, per bike plan
 - Consistency with landscape master plan (circulation elements)
 - LRDP calls for development of pedestrian plan
- Other Sources
 - Parking & Transportation (e.g., transportation options, access improvements)
 - Real Estate (access and safety improvements, city-interface)
 - Other units

Transportation Project Priorities



Current Projects

Berkeley Way / Oxford Bulb-Out



before



after

Bancroft Way Pedestrian and Transit Improvements



Dana and Bancroft Traffic Signal

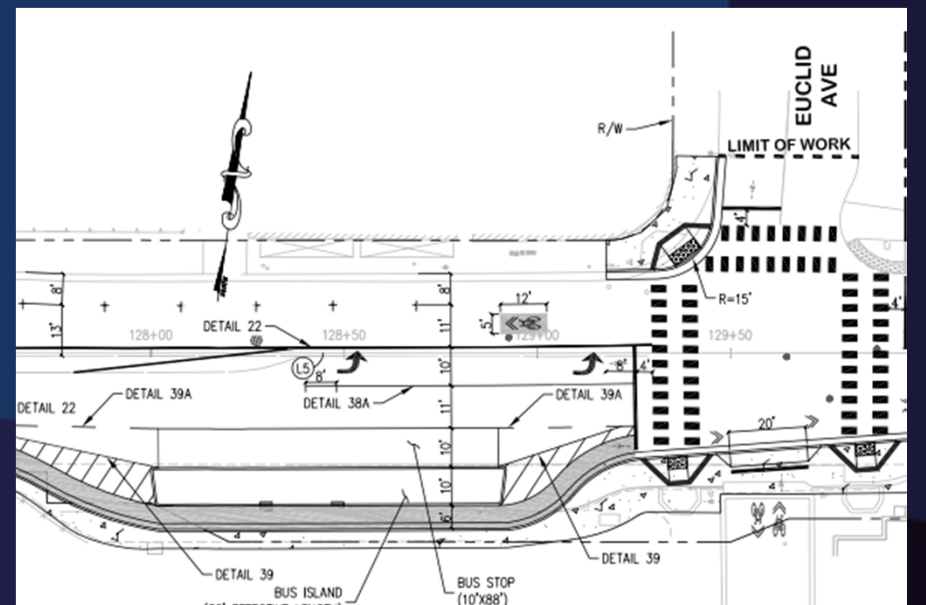
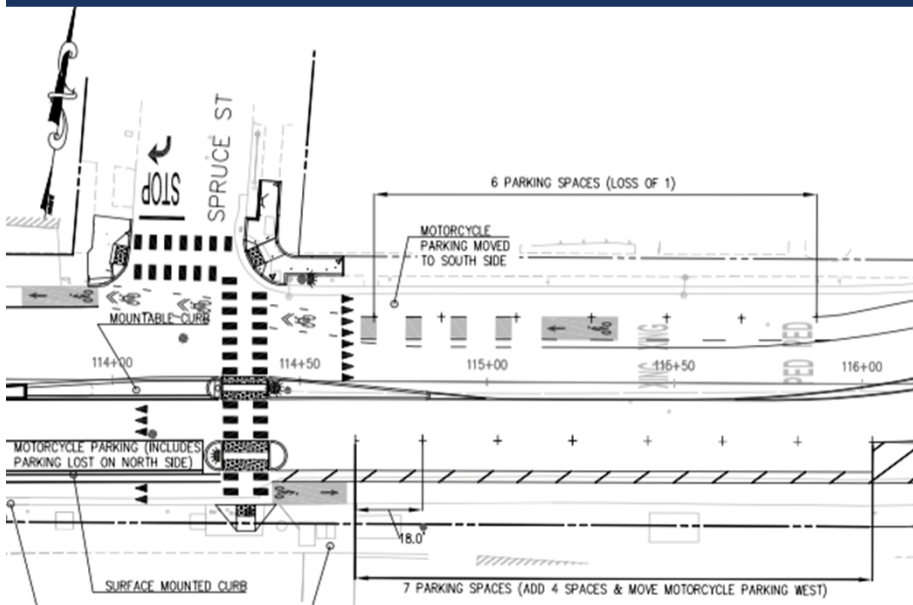


before

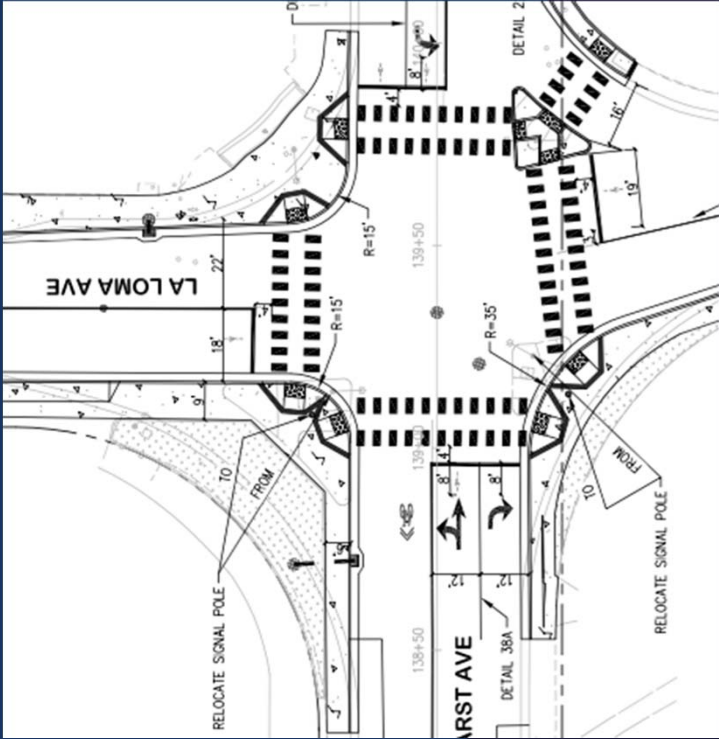


after

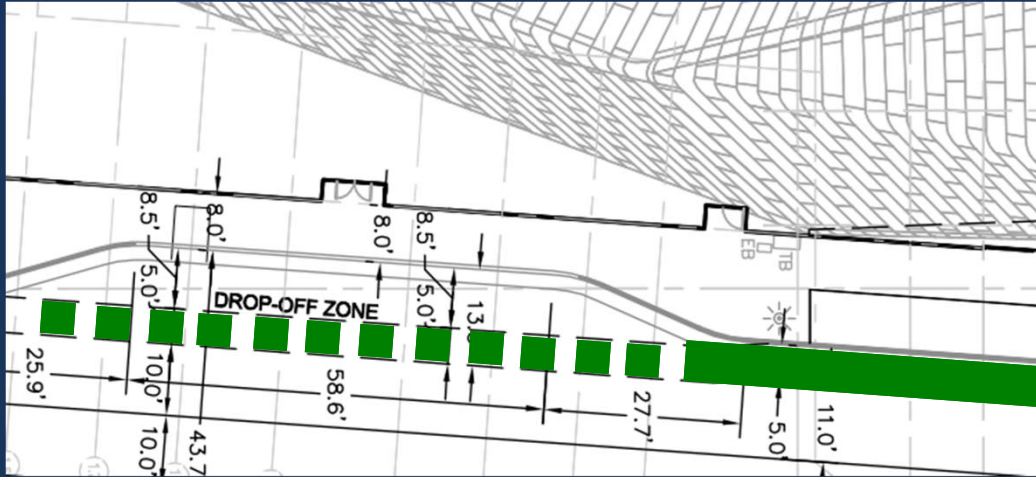
Hearst Avenue Complete Street



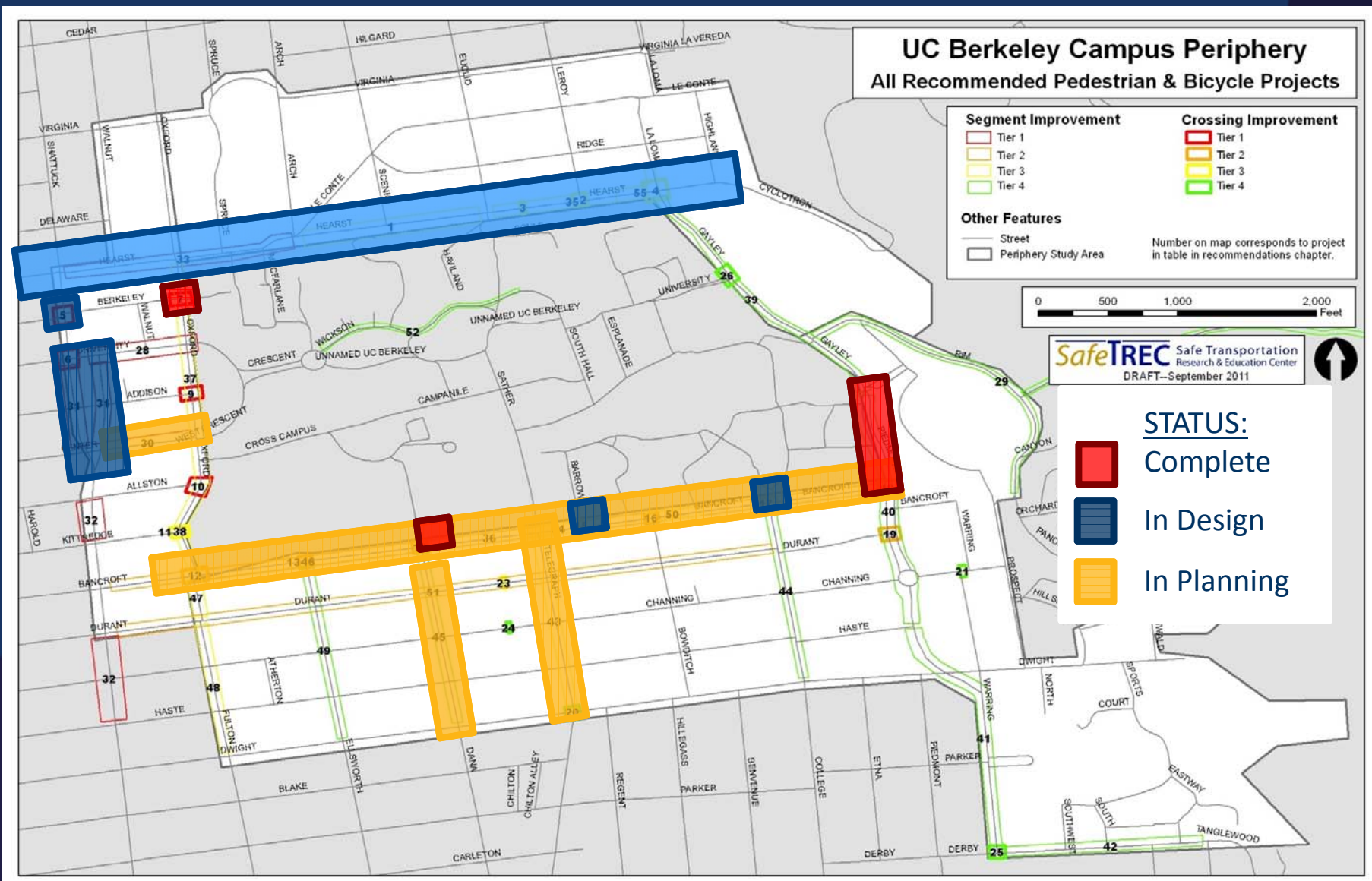
Hearst Avenue Complete Street



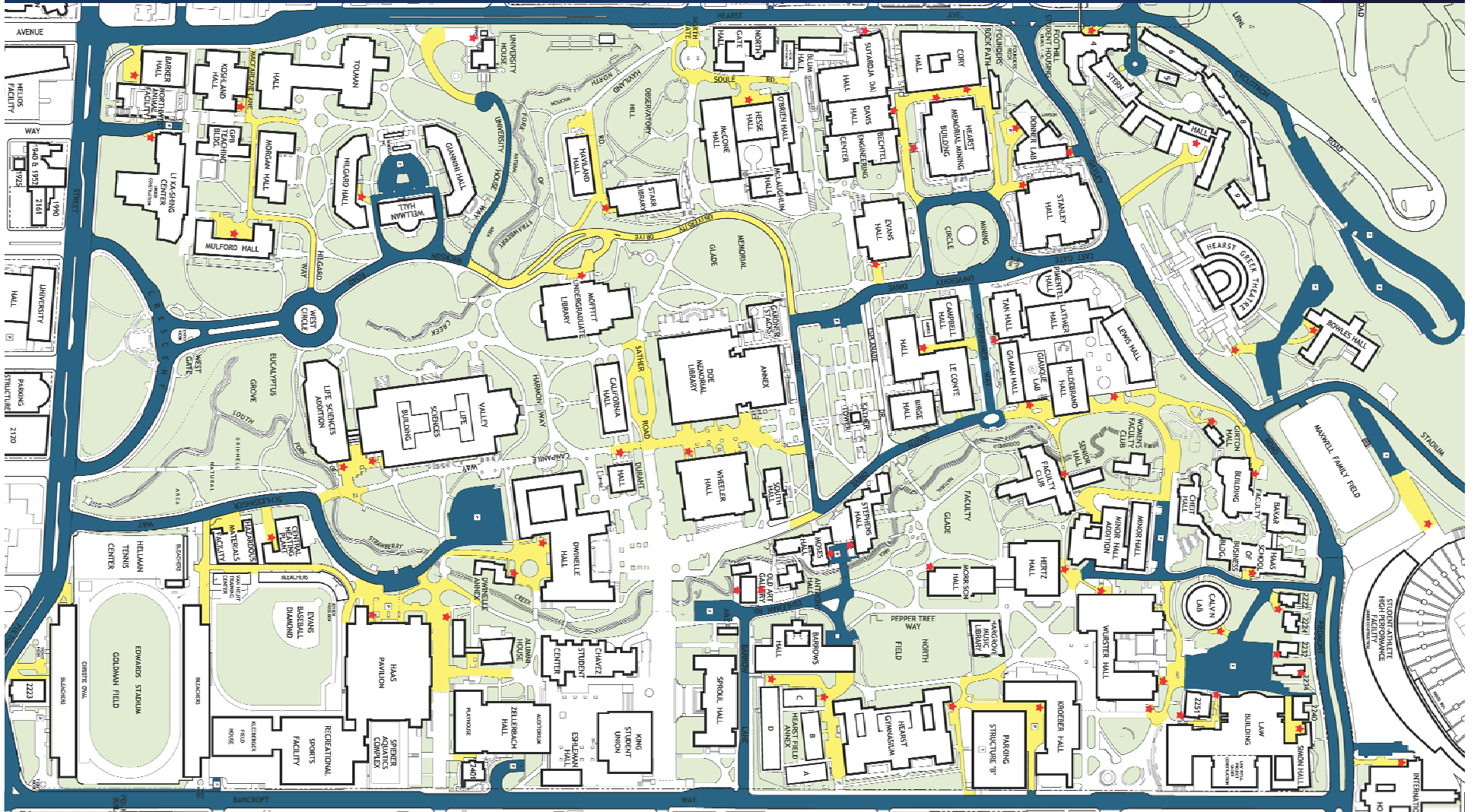
Project Implementation – Art Museum and Science Building



Periphery Study Outcomes / Status



Vehicle Access Policy



Bike Education and Ticket Diversion Program

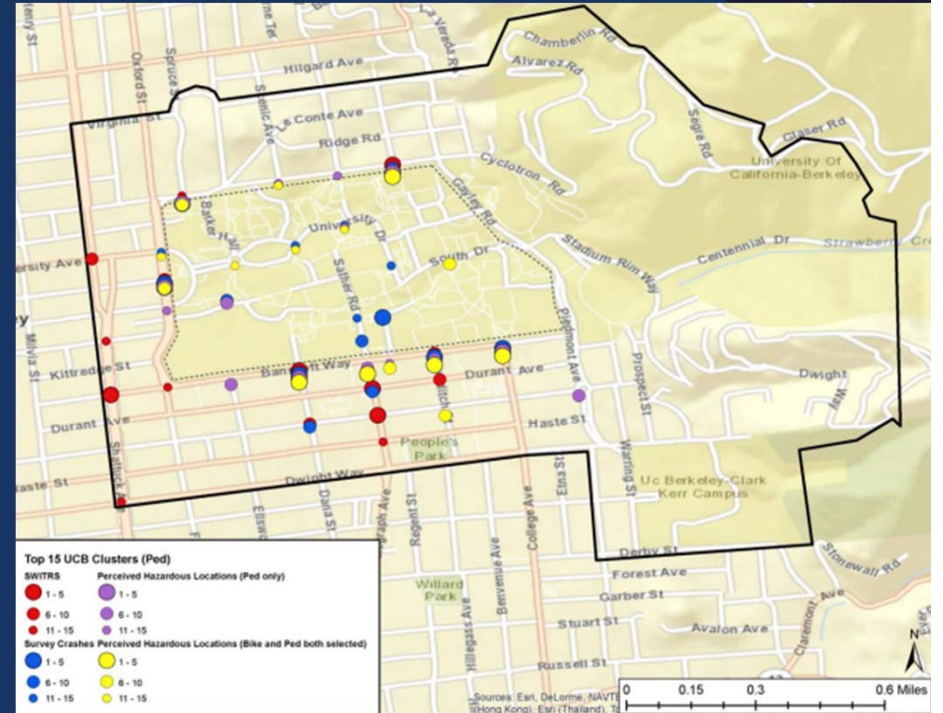
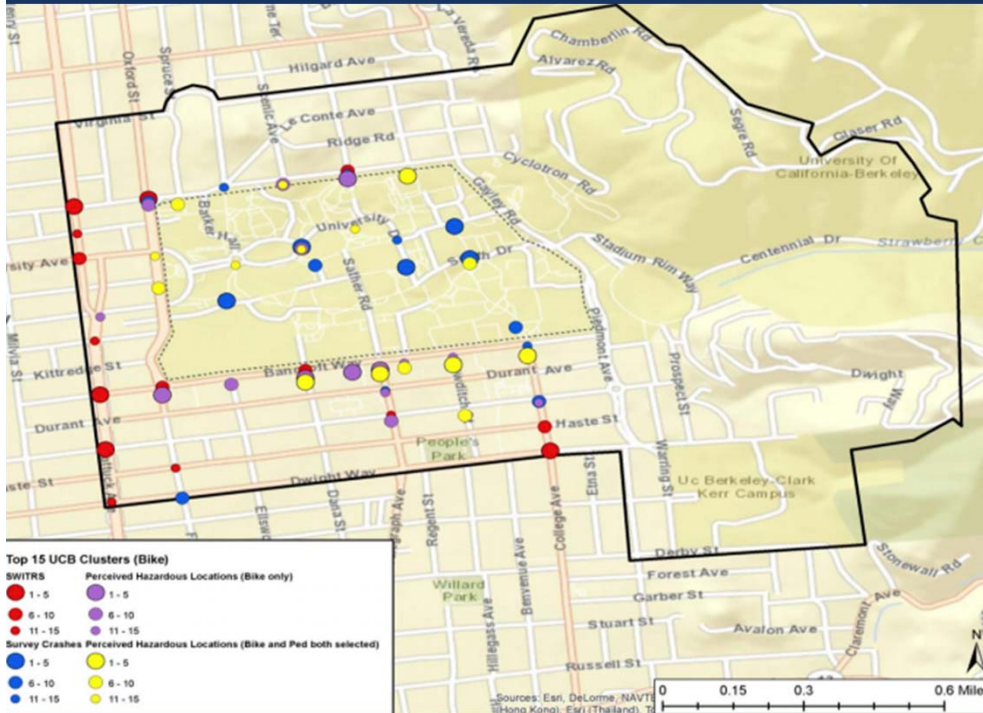


**FREE
BICYCLE
SKILLS
CLASS**

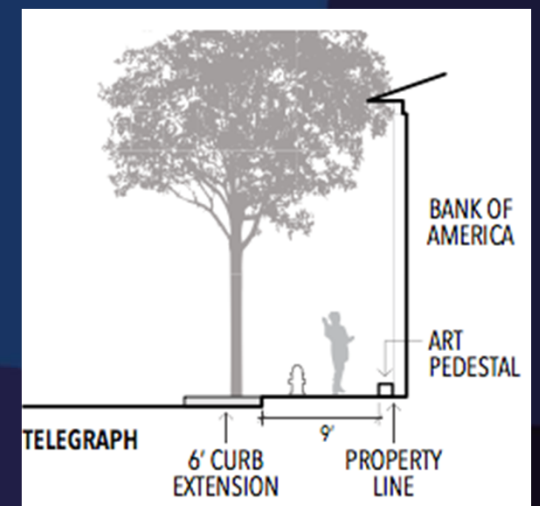
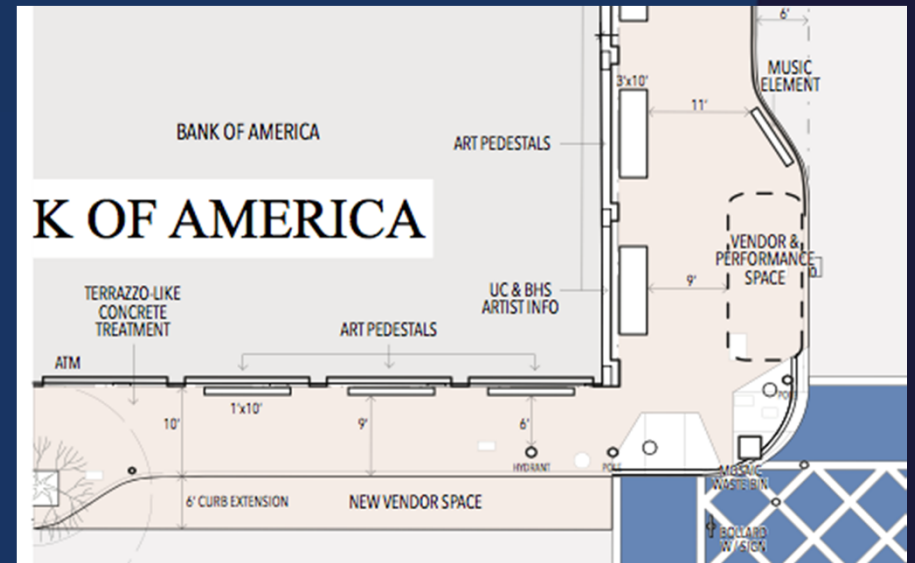
URBAN CYCLING 101 FOR ADULTS AND TEENS
LEARN SMART CYCLING SKILLS
Bike with confidence. Bike for the future. Bike for fun!

Future Projects

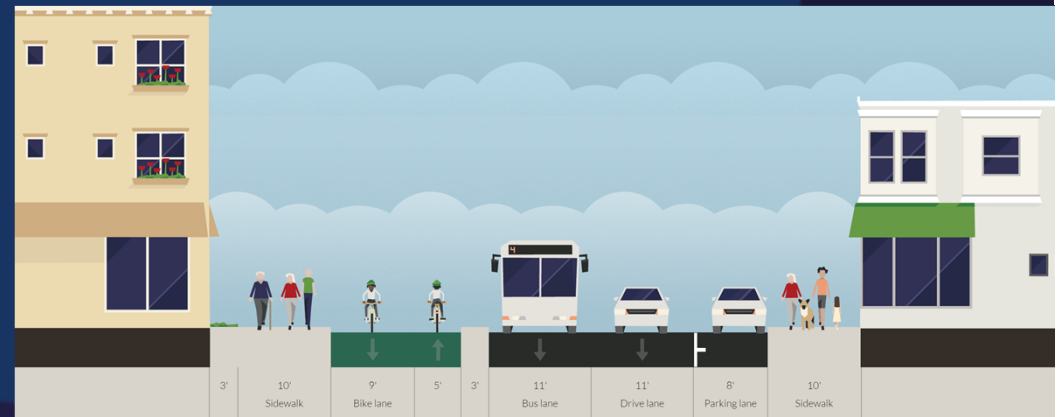
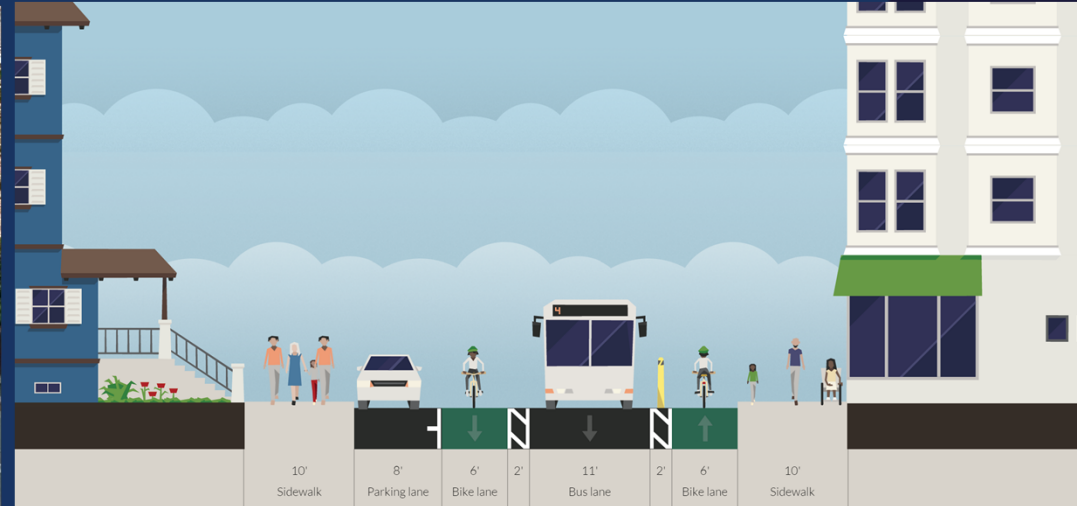
UCTC: Comparative Analysis of Pedestrian and Bicyclist Safety Around University Campuses (Grembek, et al., 03/2014)



Telegraph Avenue Public Realm -- Preliminary



Southside Bikeways -- Preliminary



Thanks!

NORTH CAROLINA STATE UNIVERSITY

Pedestrian and Bicycle Safety

Kathryn Zeringue
TDM Program Manager

PBIC Webinar
October 16, 2015



NC STATE UNIVERSITY

A land grant institution established in 1887

Campus Enrollment:

Total undergraduates: 25,176

Graduate students: 9,591

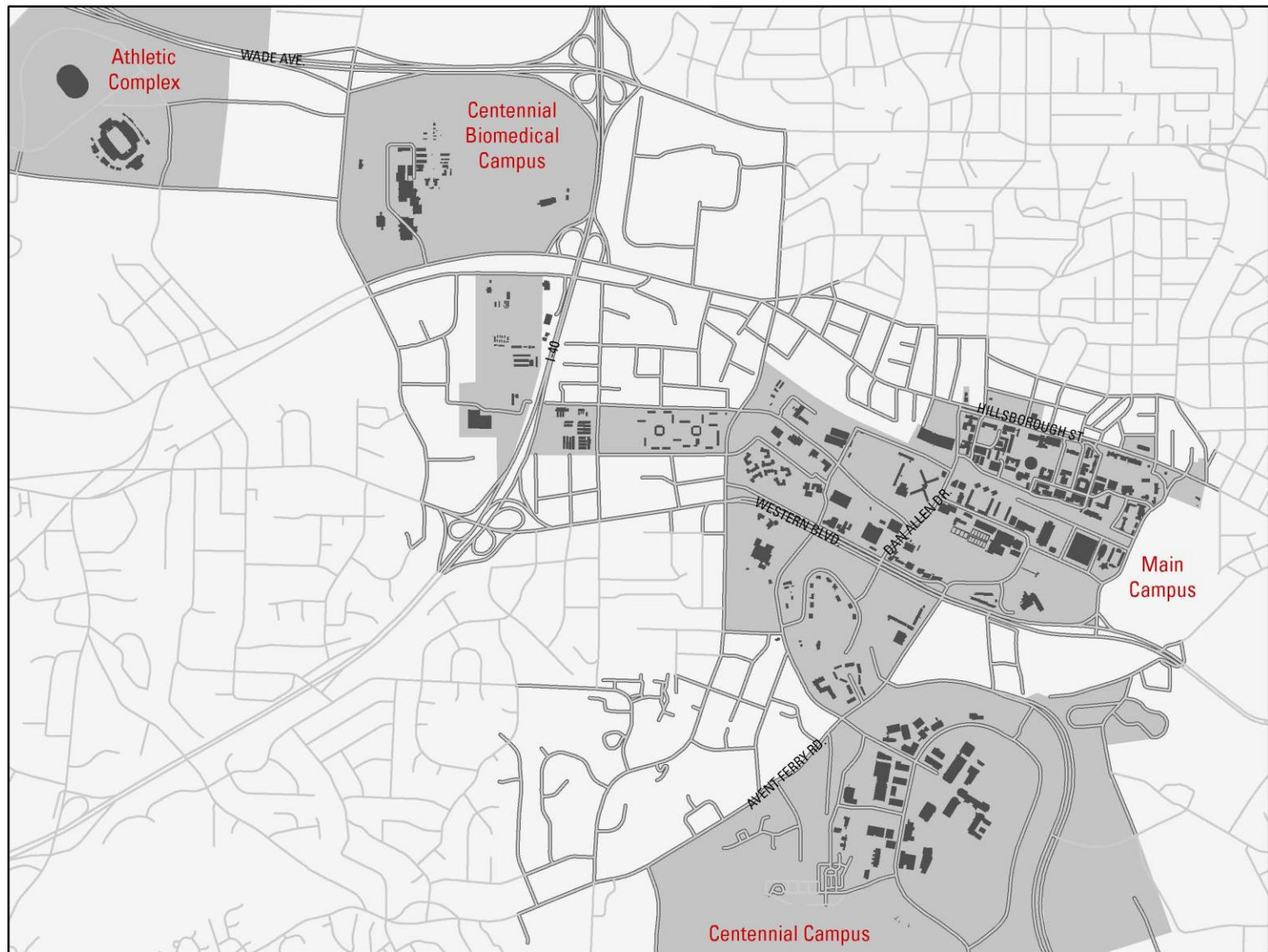
Student Population: 34,767

Faculty: 2,068

Staff: 5,554

Total Population: 42,389





North Carolina State University

Campus Bicycle & Pedestrian Safety

ENGINEERING

Hillsborough Street Road Diet



OVERVIEW:

- Commercial corridor for NCSU students
- Neighborhood connection to Downtown
- 4-lane arterial
- Heavy foot traffic

FACTORS LEADING TO STREETScape IMPROVEMENTS:

- High pedestrian crash rates
- Traffic congestion
- Lack of bicycle infrastructure
- Pedestrian fatality caused public outcry

Hillsborough Street Road Diet



Hillsborough Street, 2009



Hillsborough Street, 2011

POSITIVE IMPACTS OF STREETScape IMPROVEMENTS:

- Vehicular speeds reduced, encouraged higher frequencies of pedestrian traffic
- Decreased traffic volumes
- 23% overall reduction in crashes post construction (2012 crash data analysis)

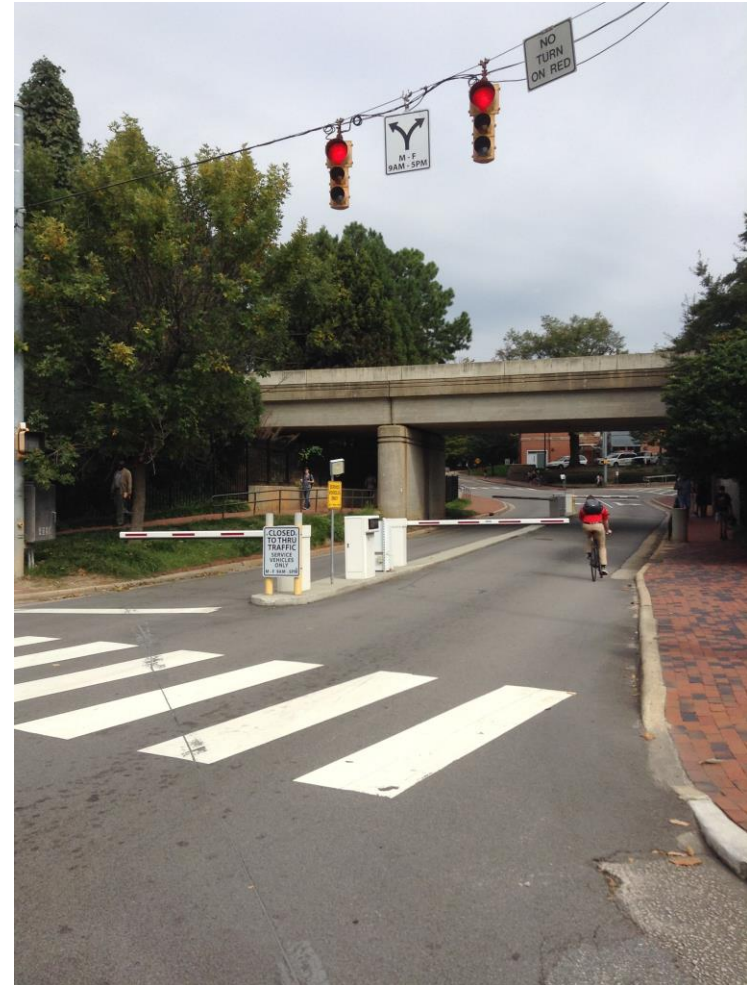
Dan Allen Drive Restricted Access

OVERVIEW:

- Dan Allen Dr. is the main North-South campus corridor
- Effective January 2013; road closure, service vehicle access only, Monday-Friday 9am-5pm

FACTORS LEADING TO CLOSURE:

- Significant amount of congestion and cut-through traffic
- New student housing west of Dan Allen Dr. that would become a major pedestrian and bike trip generator
- Improve safety of bicyclists and pedestrians



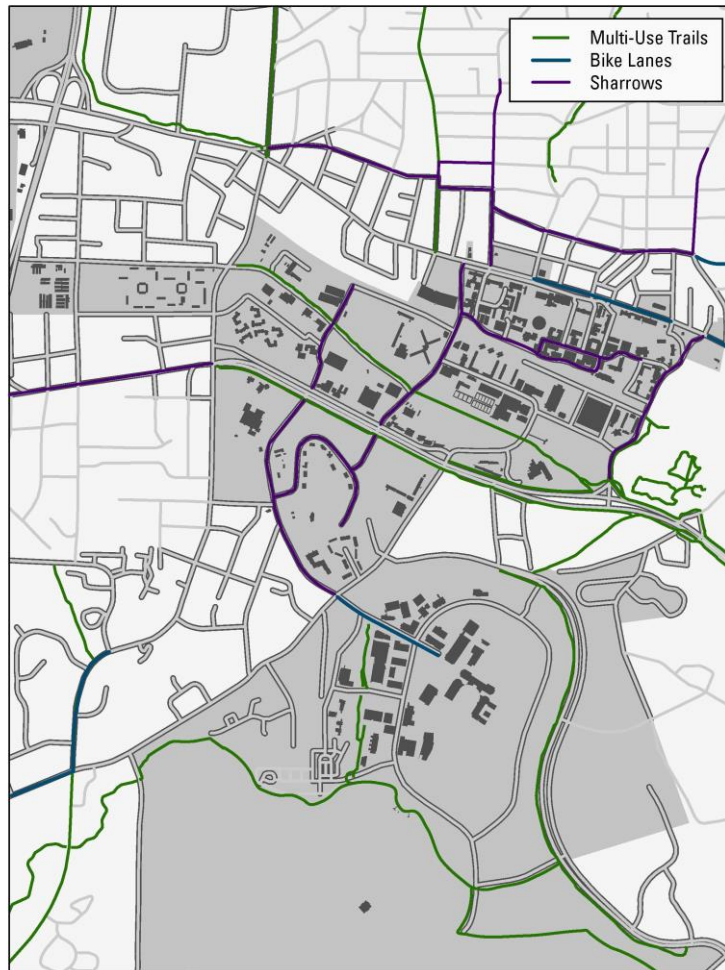


University Restricted Access Locations

POSITIVE IMPACTS OF DAN ALLEN DR. RESTRICTED ACCESS:

- Reduced traffic on Dan Allen Dr. by 30%
- Increased on-time performance of WolfLine routes along Dan Allen Dr. by 10%

Bicycle & Multi-Use Trail Networks



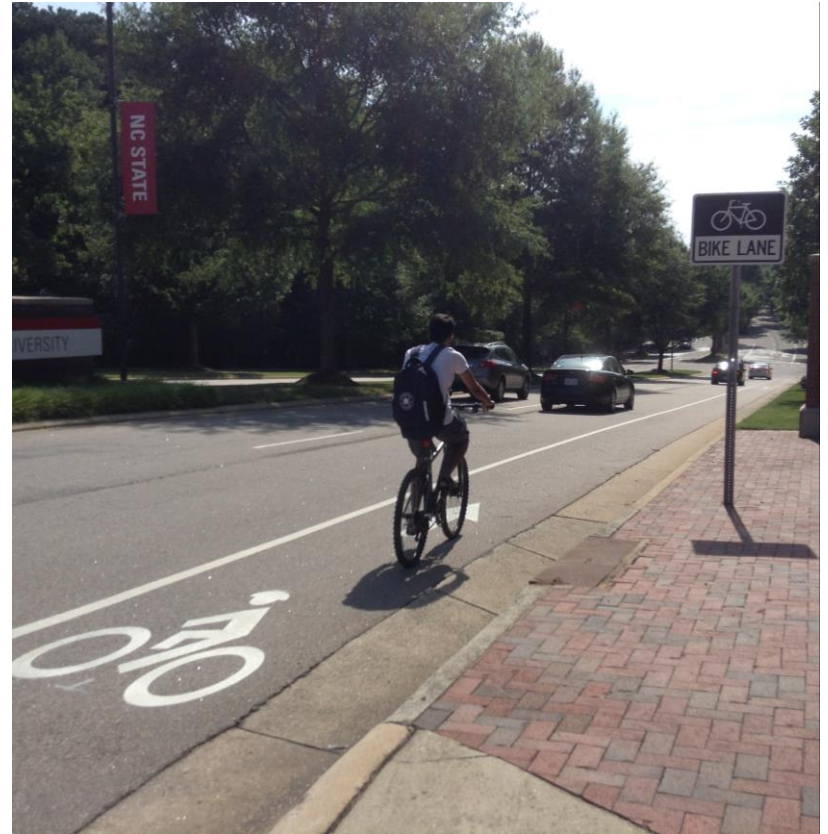
RECENT PROJECTS:

(Since 2011 Campus Bike & Pedestrian Plan)

- Varsity Dr. bike lane on Centennial Campus
- Improved connections between Centennial Campus trails and City of Raleigh trail system
- Expansion of sharrow network
- Rocky Branch Trail resurfacing with Color-Safe pavement material



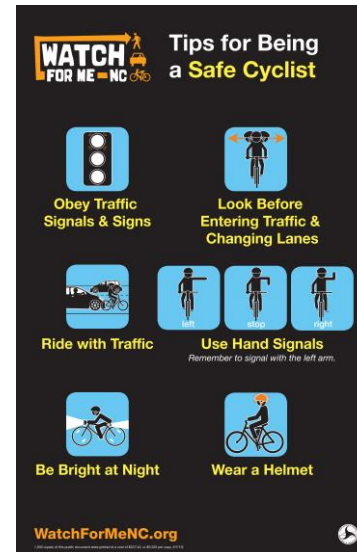
Rocky Branch Trail Color-Safe Repaving



Varsity Drive Bike Lane

Campus Bicycle & Pedestrian Safety **EDUCATION**

Watch for Me NC Campaign



OVERVIEW:

- Statewide bicycle and pedestrian safety campaign run by NCDOT
- First piloted in Raleigh-Durham-Chapel Hill in 2012
- NC State partners with the City of Raleigh & University Police to distribute pamphlets, reflective armbands, and bike lights to campus community
- Areas of outreach: new student & employee orientation, Sustainability & Transportation tabling events, WolfLine bus wraps and interior bus ads, and UPD crosswalk safety checks
- Targets motorists, bicyclists, and pedestrians

Lighten Up & Tune Up, Raleigh

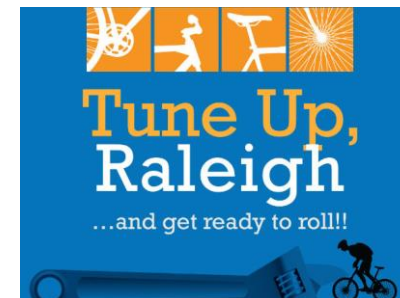
Lighten Up, Raleigh

- Fall campaign focusing on bicycle and pedestrian safety and visibility
- Sponsored by GoTriangle
- Bicyclists receive free bike lights or 10% discount on lights from a local bike shop
- Pedestrians receive wrist lights



Tune Up, Raleigh

- Spring bicycle maintenance campaign
- Sponsored by the City of Raleigh in partnership with local bike shops
- Bicyclists receive a 15% discount on tune up services
- Pamphlets also provided on how to conduct an ABC Quick Check





Lighten Up, Raleigh - Fall '15 Campaign

Bicycle Maintenance Workshops



BICYCLE MAINTAINCE EDUCATION:

- Monthly, two-part bike repair classes hosted by the NC State Craft Center
- Weekly, open-shop maintenance sessions at the University Recreation Outdoor Adventures Center
- Workshops & sessions led by student bicycle mechanics who manage the campus bike rental program, Wolf Wheels

Campus Bicycle & Pedestrian Safety

ENFORCEMENT

UPD Crosswalk Safety Program

- **Crosswalk Operations**
 - Plainclothes officer acts as a pedestrian approaching a crosswalk.
 - If the vehicle does not stop, the driver is ticketed or given a warning.
 - Drivers also given Watch for Me NC materials.
- **Educational Checks**
 - All vehicles are stopped at checking stations.
 - Police distribute Watch for Me NC materials to motorists, no ticketing.



Campus Bicycle & Pedestrian Safety

PLANNING & EVALUATION

Physical Master Plan, 2014

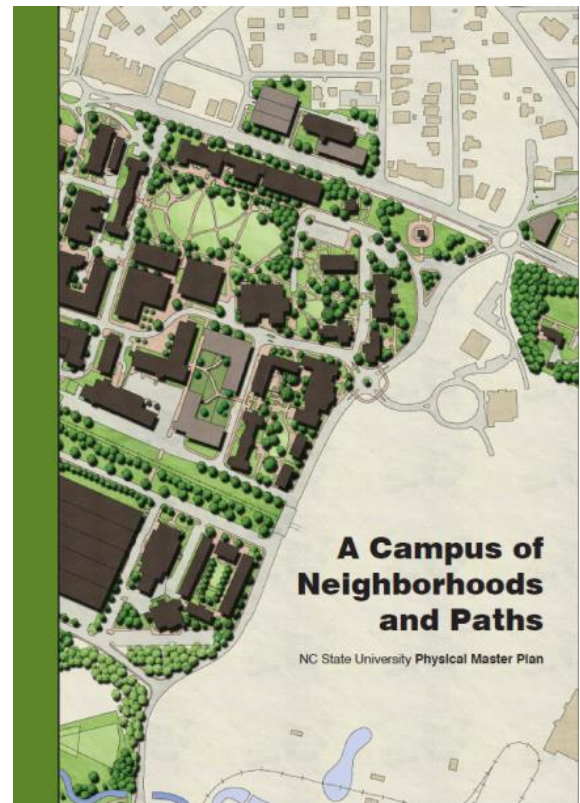
A Campus of Neighborhoods and Paths

GUIDING PRINCIPLES

- Human-scaled campus neighborhoods and paths
- Visible neighborhood activities
- Campus safety
- Effective movement for a pedestrian oriented environment

PROPOSED PROJECTS:

- Avent Ferry Rd. Streetscape Improvements
- Western Blvd. Bicycle & Pedestrian Tunnel



Bicycle and Pedestrian Plan, 2011

GUIDING PRINCIPLES

- Promote a sustainable campus
- Improve safety
- Promote health and well-being
- Improve mobility choices for on- and off-campus transportation
- Improve regional connectivity

PROPOSED PROJECTS:

- Pedestrian Scramble at Cates Ave. & Morrill Dr.
- Pullen Roadway Extension with bike lanes & multi-use path
- Gorman Street Protected Bike Lane



Evaluation

BIANNUAL TRAFFIC COUNTS

- Counts conducted on all campus streets every odd year.
- North & Central campus streets counted in mid-fall, and South & Centennial campus streets counted in mid-spring.
- Plan to develop bicycle and pedestrian count program that coincides with existing traffic count schedule.

CRASH DATA

- Receive monthly University Police crash data; City of Raleigh data – on an as-needed basis
- Evaluate crash data to propose crosswalk & streetscape improvements

BIANNUAL COMMUTER SURVEYS

- Surveys administered every odd year; employees in March, students in November
- Survey format and questions created by consultant; funded by TJCOG
- Biking & Walking Commute Questions: several asked to better understand commuter decisions and incentives and perceived safety for bicyclists and pedestrians on campus.

Questions?

Thanks so much for participating!

Contact Information:

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919.515.1613

go.ncsu.edu/wolftrails

Questions?

⇒ **Archive at www.pedbikeinfo.org/webinars**
Download a video recording and presentation slides

⇒ **Questions?**

- **Bob Schneider**
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- **Todd Henry**
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- **Kathryn Zeringue**
kezering@ncsu.edu

