

Pedestrian and Bicycle Safety Evaluation for the City of Emeryville at Selected Intersections

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SafeTREC

Contacts

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Introduction

In 2005, the City of Emeryville contracted Safe Transportation Research and Education Center (SafeTREC) to conduct a study on pedestrian and bicycle safety at four key intersections in Emeryville (Powell St. & Frontage Rd., Powell St. & I-880, Shellmound St. & Christie Ave., and Powell St. & Christie Ave.). The study included; quantitative and qualitative data collection, intersection analyses, and street design and policy recommendations. Since the report was published, the City of Emeryville has made a number of changes to the studied intersections, and the agency is interested in re-evaluating pedestrian and bicycle safety at the four study intersections. The main objectives of the proposed evaluation are;

1. Re-evaluate pedestrian and bicycle collision risk factors at four (4) intersections,
2. Evaluate pedestrian and bicycle safety measures installed in four (4) intersections,
3. Propose recommendations to address pedestrian and bicycle safety issues at four (4) intersections.

Data collected will be compared to findings in *Pedestrian and Bicycle Safety Evaluation for the City of Emeryville at Four Intersections* (2005), a report conducted by the City of Emeryville and SafeTREC to analyze safety issues at study locations.

Recommendations will be based on data collected on risk factors, existing safety measures, as well as coordinated with planned improvements that other agencies are considering, including safety improvements on I-580 on and off ramps.

The four study intersections are located on Powell St. and Christie Ave., two multimodal arteries in Emeryville. In collecting data and developing recommendations, the needs of pedestrians, cyclists, transit users and drivers, will be taken into consideration. There are also a number of stakeholder needs that must be taken into consideration when making changes to these intersections, including the Emeryville transit service, the Emery-Go-Round, Caltrans, AC Transit, and businesses located in Powell Street Plaza Shopping Center and the Emeryville Public Market.

Below, we outline the methodology used in the initial report and propose new methodology for the proposed evaluation. Data collected using the new methodology will be comparable to the data collected in the initial study, and will be used to collect more comprehensive data on pedestrian and bicycle safety.

Estimated Cost and Timeline

SafeTREC expects to complete the evaluation in 9 months (1/15/18-10/15/18) with an estimated cost of approximated \$81,877.

Methodology

Methodology used in Initial Study

In the initial report *Pedestrian and Bicycle Safety Evaluation for the City of Emeryville at Four Intersections* (2005), six methods were used to collect quantitative and qualitative data on vehicle, pedestrian and bicycle safety issues. These methods, the types of data that were collected and the methods' limitations are outlined below.

1. Collision Data

SWITRS data provided by the California Highway Patrol was used to reconstruct vehicle, pedestrian and bicycle collision data from 1998 to 2002 at each of the four intersections studied. The data is developed through police reported collisions. SWITRS data is useful in that it has been collected and publicly provided for 10 years and over the state of California, meaning collisions can be tracked and compared over time and by location.

Limitations: because the dataset only includes collisions that have been reported to the police, near misses, minor collisions and collisions involving pedestrians and bicyclists are often under-represented.¹

2. Vehicle Volumes

The City of Emeryville provided vehicle counts from 2002 and 2004 at three of the four intersections (Powell & I-80 was not included). Data was provided on vehicle approach and departure directions. 2002 data is provided as aggregate counts over the given time periods (9am-1pm and 5-9pm), and 2004 data is provided per one hour peak periods (12-1 pm and 5-6 pm).

Limitations: pedestrian and bicycle traffic were not included in the count data. The initial traffic study compensated for this by including pedestrian and bicycle traffic counts in field observations. The vehicle volume data also did not provide information on the types of vehicle traffic (single occupancy vehicles, trucks, buses, etc.). Additionally, the volumes were done before Shellmound was converted to a one-way street, and therefore did not reflect traffic patterns of the time when the study was done for two of the four intersections.

3. Pedestrian and Bicyclist Surveys

A sample of 150 pedestrians and bicyclists at each intersection completed paper surveys that were focused on their perceptions of safety at the intersection and in Emeryville at three time periods; a weekday from 12-1pm and 5-6 pm and a weekend from 12-1pm.

¹ Leilani Schwarcz, "Severe Traffic Injuries in San Francisco" (San Francisco Department of Public Health, September 2015), http://sf.streetsblog.org/wp-content/uploads/sites/3/2015/09/SevereInjuriesSF_2014_15_PSAC.pdf.

Limitations: Sampling pedestrians and bicyclists at intersections during peak hour is a relatively biased sample technique, because those who do not feel comfortable walking and bicycling in Emeryville during high traffic times will be significantly under-represented.

4. Community Forums

Two community meetings were held in two of the condo developments in Emeryville, Watergate and Pacific Park Plaza condominiums. The meetings were facilitated by SafeTREC staff and approximately 40 community members attended each meeting. During the meetings, communities members used post-it notes and aerial photographs of each intersection to note areas of concern and suggestions for improvement and were asked to identify the intersections they believed to be most dangerous.

Limitations: the forums were held as their own events and at locations that may have not been accessible to all Emeryville community members (including residents, employees and patrons). Attendance and data provided may have not been representative of the whole community.

5. Field Observations

A number of different measures were observed during safety observations, including; road user behavior, pedestrian and bicycle volumes and near misses between pedestrians, bicycles and vehicles. Field observations were conducted at 12-1 pm for pedestrians and 12-1 pm and 5-6 pm for cyclists.

Limitations: the observations were conducted with the observer in the field, meaning that observations times were relatively limited. With current technology, observations may be able to be conducted over a longer time period.

6. Field Inspections

Field inspections were conducted at all four intersections to determine adherence to ADA requirements and street design best practices. Crossing distance and single timing were also observed.

Limitations: measurements were done in field by hand, with current technology it is possible to also do measurements using Google Earth functions, ensuring accuracy and safety of observers.

Proposed Methodology for Follow-Up Study

In order to measure the effects of pedestrian and bicyclist safety and mobility measures that have been installed at the four study intersections since the initial study was conducted in 2005,

we propose to replicate the data collects to the highest degree possible while integrating new forms of data collection based in today's technology and best practices.

1. Collision Data

We propose to use SWITRS vehicle, pedestrian and bicycle collision data from 1998-2002, 2005-2009, 2010-2014 at each of the four intersections to track changes in collisions over time. We will compare collision data at the intersections to collisions in the entire Emeryville jurisdiction and to other intersections in the region with similar mode shares.

SafeTREC will also use crowdsourcing methods to collect qualitative data on near misses, minor collisions and collisions involving pedestrians and bicyclists during the community outreach events to complement SWITRS data. SafeTREC has used crowdsourcing methods to collect similar data with communities in the past, and although the accuracy and reliability of the data are uncertain, the data can be useful qualitative measures of safety when paired with SWITRS data.

2. Vehicle Volumes

We propose to use vehicle, pedestrian and bicycle counts collected by the City of Emeryville in 2002, 2004, 2008, 2009, 2010, 2015 during weekday and weekend am and pm hours, when possible. Volume data that the City of Emeryville currently provides will allow us to measure pedestrian, bicycle and vehicle traffic over time at all four intersections, addressing many of the limitations in the initial study.

3. Pedestrian and Bicyclist Surveys

We propose to distribute surveys with similar questions to those asked in the initial study. In order to address limitations of the initial study, we will distribute paper surveys and links to online surveys in common community locations, such as the Emeryville Farmers Market or Trader Joe's, in residential and business mailboxes, during the community outreach events, as well as at each of the four study intersections. Online surveys will be provided through a source like *Google Forms*, and can be available in English and Spanish.

4. Community Forums

Due to the success of the community forum in the initial study, we propose to hold two similar community meetings in two of the condo developments in Emeryville, Watergate and Pacific Park Plaza condominiums or other community locations that the City of Emeryville thinks are appropriate. Similar community engagement methods will be used. Paper and web-based maps will be available for participants to comment on.

5. Key Stakeholder Interviews

We propose to conduct interviews with key stakeholders from the following agencies and community groups in order to develop a comprehensive understanding of the diverse

needs that must be considered when making changes to these intersections. Stakeholder interviews will be conducted in-person or by phone.

- Caltrans
- AC Transit
- Selected Businesses
- Community Residents
- Bike East Bay
- Emery-Go-Round
- Emeryville Police Department
- Emeryville City Council
- Emeryville Department of Public Works

6. Field Observations

We propose to conduct field observations at each site in person as well as by video recordings, observing similar measures as in the initial study; road user behavior, pedestrian and bicycle volumes and near misses between pedestrians, bicycles and vehicles (see Appendix A). We plan to conduct in-person field observations during peak weekday and weekend hours at each of the study intersections, and record 48 hours of video footage during a weekday and weekend at each of the intersections.

7. Field Inspections

In addition to doing in-person field inspections to determine adherence to ADA requirements and street design best practices as was done in the initial study (see Appendix B), we will also collect street measurements using Google Earth to cross reference measurements done by hand (See Appendix C for an example of measurements collected using Google Earth). We will collect information regarding crossing distance and signal timing using video recordings collected in the field observations section.

8. Case Studies of Safety Improvements in Other Cities

We will develop short case studies of safety improvements adopted by cities that have comparable needs those of Emeryville. These case studies will be used to inform recommendations.

Appendix A - Field Observation Criteria

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Pedestrian Form														
Pedestrian Behavior Form														
Location:					Corner:			Observer:						
Date:					Time Start:			End:						
Weather:					Out of crosswalk			Ped Action (R A W)**						
Vehicle ? If yes, movement (L, R, S, etc.)					Vehicle violation ? *****			P-V, Conflict (?) If yes, Type						
Notes														
X walk Leg	Ped Observation	0, G=group (p)	Sex (M/F)	Age (A-D)*	Pres'd PED button	W	RH/DW	RH/DW	W	RH/DW	RH/DW	W	RH/DW	RH/DW
	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
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*A=0-9, B=10-17, C=18-64, D=65+//, **Run, Abort, Walk

*** (1) Ped changed gait or stride to avoid perceived/real threat, (2) Vehicle stops or swerves to avoid a pedestrian

**** Vehicle near/encroaching on PED during which maneuver Left, Right, Through/Straight

***** Vehicle violation: vehicle violates ped ROW, and/or breaks traffic law (e.g. runs red light)

NOTE: Please make a footnote if a PED stops on a median island or if they are running but you are unsure if there is a safety concern.

Appendix B - Field Inspection Criteria

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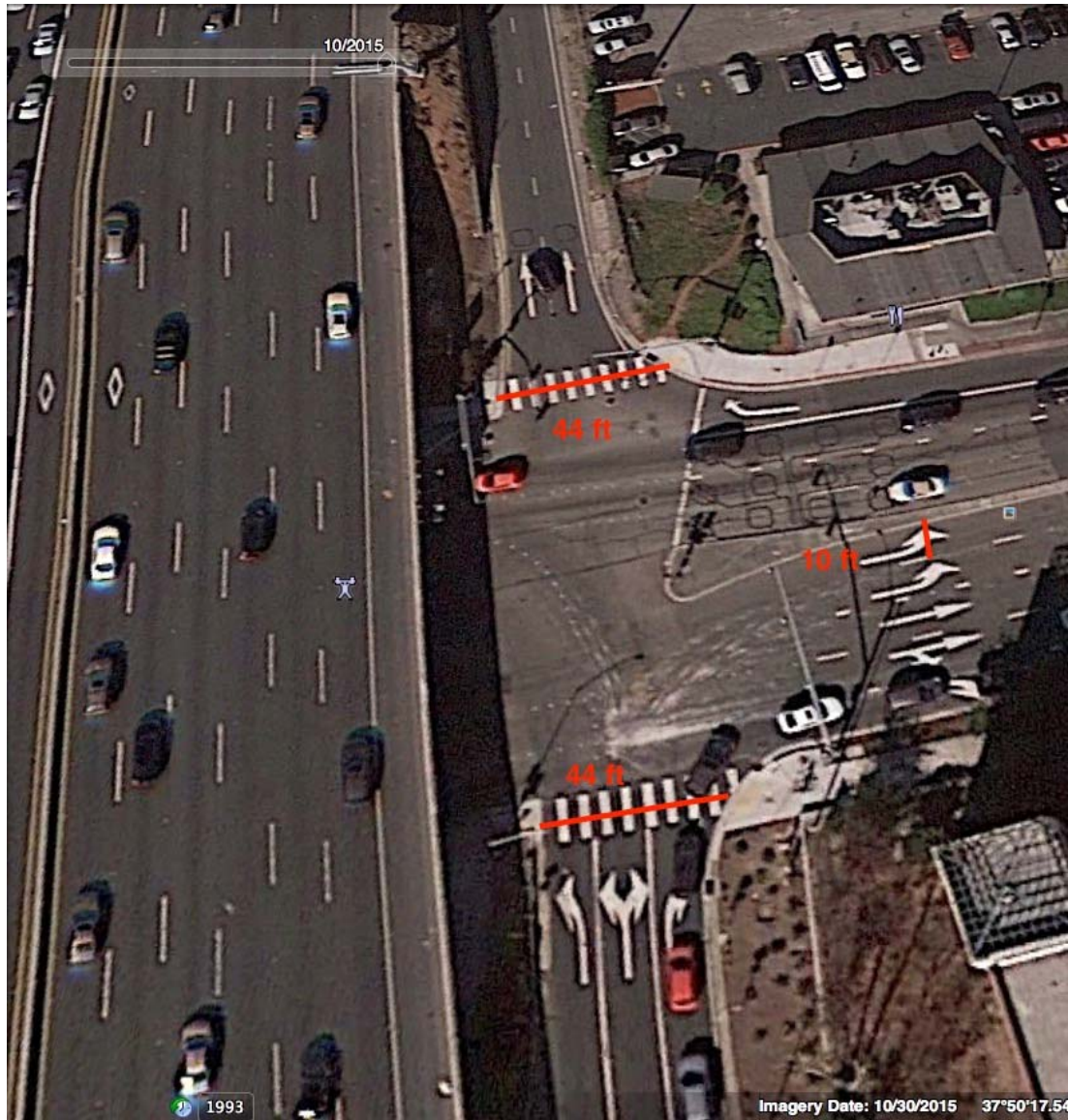
Accessibility Survey Checklist						
Intersection: POWELL & FRONTAGE						
Crossing/Connector:		Date:				
		North:	South:	East:	West:	
1	Confirm striping, xwalk & advance limit lines (clear(C) or faded (F))	E	F	C	N	C
		W	F		S	C
	Number of Lanes					
	Lane Configuration (Left Turn) (count of lanes)	E			N	
		W			S	1
	Lane Config (Through) (count of lanes)	E	2		N	2
		W	1	1	S	2
	Lane Config (Right Turn) (count of lanes)				N	
					2	
2	One-Way (y/n)					
	Traffic Signals (and restrictions), Signalized (y/n)					
	Left-turn Phase (y/n)					
	No Right Turn on Red Restriction (y/n)					
	No U-Turn (y/n)					
	Pedestrian signal head (y/n)	E	N		N	
		W	Y	Y	S	Y
3	Pedestrian signal head, countdown (y/n)					
4	Ped signal timing (4ft/sec), 2.5 ft/sec covers 95 of peds (N/A)	E			N	
		W			S	
5	Street crossing design should ensure that the boundary between the sidewalk and the street is detectable. Pedestrian crossing information should be available to all users. (tactile strips, etc.) (y/n)	E	Y		N	
		W	Y		S	
6	Level of ped traffic outside crosswalk or against signal (N/A)	E			N	
		W			S	
7	Parking locations & Approx locations from intersection, meters & towaways (distance, ft)	E			N	
		W			S	
8	Street light exist/adequate (y/n)	E			N	
		W			S	
9	Possible sight (LOS) obstructions (y/n)	E	Y		N	
		W			S	
10	ADA compliant curb ramps, w>=3ft, crossslopes 2%, level landing (y/n)	E	Y	Y	N	Y
		W	Y	Y	S	Y
11	Is foot of a curb ramp contained within the crosswalk markings (y/n)?	E			N	
		W			S	

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12	Do Street furniture, plantings, and other fixed items protrude into travel routes? (y/n) (Bad for	E			N		
		W			S		
13	Sidewalks passable for wheelchairs? w>=3ft, 5ft (60 in) turning/passing (mobility)	E	Y	Y	N	Y	Y
		W			S		
14	Sidewalk obstructions, plantings furniture, etc. inhibit ped and wheelchair mobility? 3ft-5ft (y/n)	E			N		
		W			S		
15	Curb return radius <20 ft? encourage high speed and long crossing (y/n)	E			N		
		W			S		
16	Driveway entrances within 100 ft of intersection (y/n)	E			N		
		W			S		
17	Posted speed limits nearby? Where?						
18	Are Pedestrian facilities on and along sidewalks accessible? Signal actuating buttons, drinking fountains, telephones, kiosks, and other pedestrian elements should meet accessibility criteria for approach and maneuvering space, reach range, and controls and operation. (y/n/NA)	E			N		
		W			S		
19	Bus stop locations (shelters, other struct. If within 100 feet =yes, otherwise no)	E			N	Y	
		W			S		
20	Existing median (size) ? (in feet)						
21	Is median suitable for a refuge? (y/n)						
22	Possible 4ft median insert w/10ft lanes (lane reduction) (y/n)?						
23	Potential for curb bulbs (towaways, bus stops, utilities, drains, poles)	E			N		
		W			S		
23	Adjacent land uses (up to 2 blocks away) Residential, Commercial, Industrial, School, Government (R, C, I, S, G) comma delimited	E			N		
		W			S		

Appendix C - Intersection Images and Measurements via Google Earth

Powell & I-80



**Budget: Evaluation of Pedestrian and Bicycle Safety
Measures for the City of Emeryville at Four Intersections**

	Monthly Rate	# months	Unit	%	Year 1	TOTAL BUDGET
Academic Personnel						
Jill Cooper Principal Investigator	\$10,757	9	cal. yr.	5.0%	\$4,841	\$4,841
Graduate Student Researcher, Academic	\$4,207	4.5	acad. Mo.	35.0%	\$6,626	\$6,626
Graduate Student Researcher, Summer	\$4,207	3	summer mo.	100.0%	\$12,621	\$12,621
TOTAL ACADEMIC PERSONNEL					\$24,088	\$24,088
Staff Personnel						
Finance Analyst	\$9,098	9	cal. yr.	5.0%	\$4,094	\$4,094
2 Student Assistant	\$2,784	9	cal. yr.	30.0%	\$15,034	\$15,034
TOTAL STAFF PERSONNEL					\$19,128	\$19,128
TOTAL ACADEMIC AND STAFF PERSONNEL					\$43,216	\$43,216
Employee Benefits						
	<u>Employee Benefit Rate</u>					
Jill Cooper		40.00%			\$1,936	\$1,936
Finance Analyst		48.00%			\$1,965	\$1,965
GSR Tuition Remission - \$9316/semester					\$9,316	\$9,316
TOTAL EMPLOYEE BENEFITS					\$13,217	\$13,217
TOTAL PERSONNEL & BENEFITS					\$56,433	\$56,433
Travel						
In State Travel					\$100	\$100
TOTAL TRAVEL					\$100	\$100
Other Direct Costs						
Office Supplies					\$100	\$100
Printer Lease					\$311	\$311
Communications					\$414	\$414
Office Space					\$5,228	\$5,228
Computer/Software					\$1,500	\$1,500
Intersection Cameras					\$2,500	\$2,500
Research Materials					\$900	\$900
General, Automobile and Employment Liability (GAEL)					\$497	\$497
TOTAL OTHER DIRECT COSTS					\$11,450	\$11,450
TOTAL DIRECT COSTS					\$67,983	\$67,983
					MTDC	
					\$53,439	
Indirect Costs						
26% of Modified Total Direct Costs					\$13,894	\$13,894
TOTAL AMOUNT REQUESTED					\$81,877	\$81,877

Budget Justification

Personnel

- Jill Cooper, Principal Investigator (total effort = 0.45 calendar months) will provide the overall guidance and direction for the technical and analytical efforts of the research.
- Finance Analyst (total effort = 0.45 calendar months) will oversee financial aspects of project activities, will monitor project-specific personnel, and ensuring compliance with UC and sponsor policies and procedures.
- Graduate Student Researcher (effort = 1.575 academic months and 3 summer months) will assist with research projects under the guidance of the project's Principal Investigator. The graduate student researcher will conduct background research, develop and implement data collection and analysis protocols, and write the final report.
- Undergraduate Student Assistant (effort = 2.7 calendar months each) will assist with literature review and research under the supervision of the Principal Investigator.

Fringe Benefits.

The University of California, Berkeley Composite Fringe Benefit Rates (CFBR) have been reviewed and federally approved by the Department of Health and Human Services (DHHS) for use by all fund sources for FY18. Rates beyond June 30, 2018 are estimates and are provided for planning purposes only. Future CFBR rates are subject to review and approval by DHHS on an annual or bi-annual basis. Fringe benefits are assessed as a percentage of the respective employee's salary. The benefit rates are as follows:

UCB Composite Benefit Rates (effective 7/1/2017)				
	Approved	Projections for Planning Purposes ----->		
CBR Rate Group	FY18	FY19	FY20	FY21
Academic	40.0%	40.0%	40.0%	40.0%
Staff	48.0%	48.0%	48.0%	48.0%
Limited	16.0%	16.0%	16.0%	16.0%
Students (Graduate and Undergraduate)	0.0%	0.0%	0.0%	0.0%

- The University of California provides tuition remission of tuition, fees, and graduate student health insurance to all graduate students who are employed on-campus at least 25% time during the academic year. The projected rate for in-state remission is \$9,316 per semester.

Travel

In-State Travel: Costs are included to attend meetings with city and community stakeholders, and conduct field work.

Materials and Supplies

Office Supplies – Used for standard office supplies to directly support grant-related activities, grant monitoring and reporting.

Computer/Software – Used for tracking grant activities and producing required reports. Costs may include monitor, printer, software, accessories, and software licenses.

Intersection Cameras – Used for photographing drivers, pedestrians and bicyclists at or approaching/leaving intersections to observe safety behavior.

Research Materials – Includes maps, posters, fact sheets, and reports.

Other Direct Costs

Printer Lease – Includes the costs for leasing printer/copier for use in printing and the duplication of grant materials.

Communications - Costs of telephone, cell phone, mail/messenger (excluding overnight priority mail), and similar communication services.

GAEL – The GAEL assessment rate is 1.15% of the payroll expense and applies to all funds except federal and federal flow-through funds.

Rent

Office Space: Office space rental costs are included as an Other Direct Cost because the University's indirect cost rate agreement excludes rental costs of off-campus facilities. The University has made arrangements for SafeTREC to rent spaces at

the American Baptist Seminary of the West (2614 Dwight Way, Berkeley, CA) and the research will be conducted at that location. Indirect cost is not collected on the Office Space rental cost.

Indirect (F&A) Costs

Indirect Costs are charged on the federal rate of 26% of modified total direct costs (MTDC) for off-campus departments. Modified total direct costs consists of all salaries and wages, fringe benefits, materials, supplies, services (contractors), travel and subrecipients up to the first \$25,000 of each subrecipient (regardless of the period covered by the subrecipient). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subrecipient in excess of \$25,000.