SAFE ROUTES TO SCHOOL
Final Report Summary

by

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EXECUTIVE SUMMARY

Background

The SR2S program was authorized by AB 1475 in 1999 and reauthorized by SB 10 in 2001. The program provides funding for construction projects near schools, with the intent of increasing pedestrian and bicyclist safety and improving the environment for non-motorized transportation to and from school.

This report evaluates the success of the SR2S program. While the intent of this research is to produce a study that has an emphasis on accident reduction, we note that a study of changes in accident rates resulting from SR2S construction is not yet possible, since research would have to track accident rates for several years after SR2S construction to infer an impact. For that reason, this study focuses on characteristics of vehicle traffic and pedestrian and bicycle traffic that are associated with pedestrian accidents. The data here include information on the yielding of vehicles to non-motorized traffic, vehicle counts, and vehicle speeds, all of which can be examined for changes that would correlate with improvements in pedestrian or bicyclist safety. The research team also observed the numbers of child pedestrians and bicyclists, and whether those pedestrians/bicyclists used a sidewalk, path, street, or shoulder. In addition to that, the research team distributed a survey to parents of schoolchildren at selected SR2S schools before and after SR2S project construction.

Study Design and Methods

The research team collected baseline (pre- SR2S project construction) and post- SR2S project construction data for each of sixteen elementary school sites. Of the sixteen schools studied, full before and after data are only available for nine schools. At the other seven schools, SR2S project construction was not completed in time to be included in this report.

SR2S Study Sites

	City / County	Caltrans District	County	School Name	Improvement
1	City of Bell Gardens	7	Los Angeles	Cesar Chavez Elementary	Install traffic signal
2	City of Chino	8	San Bernardino	Newman Elementary	Install traffic signal
3	City of El Sobrante	4	Contra Costa	Sheldon Elementary	Construct sidewalk gap closures
4	City of Encinitas	11	San Diego	Ocean Knoll Elementary	Construct sidewalks
5	City of Glendale	7	Los Angeles	Glenoaks Elementary	Install in-pavement crosswalk signal system to alert approaching vehicles of children in the crosswalks
6	City of Gonzales	5	Monterey	La Gloria Elementary	Install sidewalks and bikeways, traffic signal, signs and pavement markings, traffic calming and traffic diversion
7	City of Malibu	7	Los Angeles	Juan Cabrillo Elementary	Construct pathway of decomposed granite, bordered by wood curb, with appropriate signage
8	City of Murrieta	8	Riverside	Murrieta Elementary	Install bike lanes, sidewalk, curb, gutter
9	City of Oakland	4	Alameda	Hawthorne Elementary	Construct sidewalk bulbout, pedestrian head
10	City of Rancho Cucamonga	8	San Bernardino	Jasper Elementary	Install pedestrian-activated flashing warning signal system
11	City of San Bernardino	8	San Bernardino	Mt. Vernon Elementary	Install traffic signal system
12	City of Santa Clarita	7	Los Angeles	Sulphur Springs Elementary	Construct pedestrian bridge over creek, construct sidewalk
13	City of South Gate	7	Los Angeles	Montara Elementary	Install flashing safety signal for pedestrian crossings, replace deteriorated sidewalk, install new street safety signal at crosswalks, install speed humps
14	City of Whittier	7	Los Angeles	Evergreen Elementary	Construct sidewalk and disabled access ramps around Evergreen Elementary School
15	City of Yucaipa	8	San Bernardino	Valley Elementary	Install sidewalk gap closures
16	San Bernardino County	8	San Bernardino	West Randall Elementary	Install sidewalk gap closures

The SR2S projects at these sites are representative of six different project work types, as shown below.

Work Type	Schools
Sidewalk improvements	Sheldon Elementary, West Randall Elementary (primarily sidewalks) Murrieta Elementary, Valley Elementary, La Gloria Elementary (includes other work types) Juan Cabrillo Elementary, Ocean Knoll Elementary
Traffic calming & speed reduction	La Gloria Elementary, Hawthorne Elementary
Pedestrian/bicycle crossing	Mt. Vernon Elementary, Jasper Elementary, Valley Elementary, Glenoaks Elementary
Bicycle facilities (on-street or off-street)	La Gloria Elementary, Murrieta Elementary
Traffic control devices	Cesar Chavez Elementary, Newman Elementary
Traffic diversion improvements	La Gloria Elementary, Sulphur Springs Elementary

Note: Most projects with multiple work types are shown in multiple categories.

Traffic data were collected at each school location by a team of three or four observers. Those researchers recorded information on vehicle counts, vehicle speeds, yielding of vehicles to non-motorized traffic and vice versa, and the number of pedestrians and bicyclists both before and after the SR2S project was constructed. Information was also collected on the urban design, or physical character, of the neighborhood surrounding each school, emphasizing aspects of the neighborhood design that might facilitate or impede overall walking.

As part of this research, investigators also surveyed parents of children in the 3rd through 5th grade at each school in the study. The survey was distributed before construction of the SR2S project, to get baseline data on school demographics and child travel patterns to and from school, and again after SR2S construction to measures changes in child travel patterns to or from school. In addition, the survey distributed to 3rd through 5th grade parents after SR2S construction included a battery of questions to assess parental opinion about the effectiveness of the SR2S construction project.

Expected and Measured Effects

The research team expected that different SR2S projects would produce different effects. The tables below show the expected impact and measured result for each project. The evaluation hinged in part on whether the measured impacts were consistent with the expected impacts.

Project Description and Expected Impact

Project Information			Expected Impacts				
			Walking/Bicycling Impacts		Traffic Impacts		
Project Type	School	Project Description	Amount	Location	Vehicle Counts	Vehicle Speed	Yielding
Traffic Control Devices	Cesar Chavez Elementary	Traffic light replaces 4-way stop sign	+ (?)	None	- (?)	-	+
Pedestrian/Bicycle Crossing	Glenoaks Elementary	In pavement crosswalk lighting	+ (?)	None	None	- [a]	+
Pedestrian/Bicycle Crossing	Jasper Elementary	In pavement flashing warning light [b]	+	None	None	-	+
Sidewalk Improvements	Juan Cabrillo Elementary	Pathway of decomposed granite with wood curb	+	On sidewalk	None	None	None
Pedestrian/Bicycle Crossing	Mt. Vernon Elementary	Pedestrian "countdown" crossing light [c]	+ (?)	None	None	None	None
Sidewalk Improvement and Bicycle Facilities	Murrieta Elementary	Sidewalk and bicycle path construction	+	On sidewalk	None	None	None
Sidewalk Improvements	Sheldon Elementary	Sidewalk gap closures (about 400 feet)	+	On sidewalk	None	None	None
Sidewalk Improvements and Pedestrian/Bike Crossing	Valley Elementary	Sidewalk gap closures (3,000 ft.) and crosswalk	+	On sidewalk	None	- (?)	+
Sidewalk Improvements	West Randall Elementary	Sidewalk gap closures (about 2,200 feet)	+	On sidewalk	None	None	None

Notes: "Location" refers to walking only, and whether walking occurs on sidewalk/path or street/shoulder. For location, "on -sidewalk" indicates an expected increase in walking on a sidewalk or path. Yielding refers to yielding of vehicles to pedestrians/bicyclists only. Expected impacts denoted by "?" are less strongly expected.

[a] At Glenoaks, note that traffic at the location of the crosswalk lighting system in front of the school, was congested before the improvement, which reduces the likelihood of further reductions in vehicle speeds.

[b] No traffic signal or 4-way stop was located at this intersection, before or after SR2S project construction. The warning light is in-pavement lighting.

[c] A pre-existing traffic light was located at this intersection. Pedestrian "countdown" light shows time remaining before light changes.

Note that the following project types are represented in the before/after analysis: Sidewalk Improvements, Pedestrian/Bicycle Crossings, Traffic Control Devices, and Bicycle Facilities. Two types of projects are not represented in the before/after analysis: Traffic Calming and Traffic Diversion. The study sites for those two project types (La Gloria, Hawthorne, and Sulphur Springs) had not finished SR2S project construction by the time data were analyzed for this report.

Project Description and Measured Impact

School	SR2S Work Type	Project Description	Evidence of Success	Summary of Measured Results and Comments
Cesar Chavez Elementary	Traffic Control Device	Traffic signal at intersection that previously had no signal	Strong evidence of success	Increase in yielding of vehicles to pedestrians; decrease in vehicle speed; in area with high amounts of walking (walk/bike mode split at school approximately 50%)
Glenoaks Elementary	Pedestrian/ Bicycle Crossing	In-pavement crosswalk lighting	Strong evidence of success	Increase in yielding of vehicles to pedestrians; pedestrian counts show increase in walking
Jasper Elementary	Pedestrian/ Bicycle Crossing	In-pavement crosswalk lighting	No evidence of success	No change in yielding of vehicles to pedestrians; simultaneous opening of I-210 Freeway extension confounds measurement for this project, as I-210 appears to have diverted traffic from SR2S site, which could be associated with the observed increase in vehicle speeds at SR2S site
Juan Cabrillo Elementary	Sidewalk Improvement	Walking path	Weak evidence of success	Shift in walking from street/shoulder to path, but little walking was on street or shoulder before SR2S construction; low walking rates (walk/bike mode split from 5% to 7%) and most pedestrians are children and parents who drove to school, park down the street, and then walk into school
Mt. Vernon Elementary	Pedestrian/ Bicycle Crossing	Pedestrian warning light at intersection that already had traffic signal	No evidence of success	No change in amount of walking; project's main effect might have been convenience, which is not well measured by the objective outcome indicators summarized here
Murrieta Elementary	Sidewalk Improvement and Bicycle Facilities	New sidewalks and on-street bicycle paths	No evidence of success	Very low walking/bicycling amounts before and after SR2S project construction

School	SR2S Work Type	Project Description	Evidence of Success	Summary of Measured Results and Comments
Sheldon Elementary	Sidewalk Improvement	Sidewalk gap closures	Strong evidence of success	Shift in walking from street/shoulder to path (34% of observed child pedestrians on sidewalk before SR2S project, compared with 65% on sidewalk after SR2S project); fast vehicle speeds on adjacent road (average from 30 to 40 mph) suggests large increase in safety from separation of pedestrians and vehicles; some evidence of increase in amount of walking
Valley Elementary	Sidewalk Improvement and Pedestrian/ Bicycle Crossing	Sidewalk gap closures and new crosswalk	Strong evidence of success	Shift in walking from street/shoulder to path (58% of observed child pedestrians on sidewalk before SR2S project, compared with 96% on sidewalk after SR2S project)
West Randall Elementary	Sidewalk Improvement	Sidewalk gap closures	Strong evidence of success	Shift in walking from street/shoulder to path (25% of observed child pedestrians on sidewalk before SR2S project, compared with 95% on sidewalk after SR2S project); high levels of walking before and after project; walking increased after SR2S project

Schools were classified as having strong evidence of success if the measured outcomes corresponded to expected outcomes, if the measured outcomes exceeded the sample error in the survey data or the estimated human error in data collection (as appropriate), if the data provide a consistent indicator of project success, and if the magnitude of impact was reasonably large. The research team found strong evidence of success at five of the nine schools studied (Cesar Chavez Elementary, Glenoaks Elementary, Sheldon Elementary, Valley Elementary, and West Randall Elementary).

Note that the above criteria for success are possibly overly strict. These criteria require that a project produce a near-term, measurable impact that can be observed. Projects that contribute to behaviors that cannot be easily measured but that contribute to safety would not be ranked as a success by these criteria. A simple examination of projects classified as having "strong evidence of success" likely understates the success of the SR2S program. The research team believes that the fact that five of nine projects received a ranking of "strong evidence of success" suggests that the SR2S program on the whole was highly successful. The criterion for overall program success should not be that all SR2S projects deliver immediate and unambiguously measurable impacts, as that would not be possible even in the best of circumstances.

Evidence of Success by Work Type

Among the five sidewalk improvement projects studied, the SR2S sidewalk improvements at three schools (Sheldon, Valley, and West Randall) showed strong evidence of success. In all three cases, the success of the project was based primarily on large improvements in separating pedestrian traffic from vehicle traffic. Of the four schools with pedestrian/bicycle crossing improvements, the SR2S project at two schools (Glenoaks Elementary and Valley Elementary) showed strong evidence of success. The success of the project at Valley Elementary is based more on the sidewalk improvements than on the crosswalk. Thus, the only school where there is strong evidence of success for a pedestrian/bicycle crossing improvement is Glenoaks Elementary. The traffic control device, a traffic signal at Cesar Chavez Elementary, showed strong evidence of success. The only bicycle facility, on-street bicycle paths near Murrieta Elementary, showed no evidence of success. Overall, the most successful work types, based on the data summarized above, appear to be sidewalk gap closures in areas with pre-existing pedestrian traffic or traffic signals in areas with large amounts of both pedestrian or vehicle traffic.

Parental Opinion

The SR2S projects fare very well when measured by parental opinion. Large majorities of parents at all schools noticed the project, stated that the project would increase safety, and had a favorable opinion of the project.

Conclusions and Recommendations

Given the strong parental approval of the SR2S projects and the encouraging changes in traffic, pedestrian, and bicycle traffic, the research team concludes that the SR2S construction program has been successful in meeting its goals. It is the recommendation of the research team that the SR2S program be continued. Other recommendations include the following:

- Sidewalk gap closures near schools with moderate or high amounts of walking appear to be strong candidates for SR2S funding. Such projects are especially likely to produce increases in pedestrian safety.
- Traffic control projects that regulate yielding at intersections where large volumes of vehicle and pedestrian traffic intersect also are good candidates for SR2S funding.
- At schools where there are low levels of walking or bicycle travel, SR2S construction by itself will likely not be sufficient to increase non-motorized travel to or from school. At such locations, SR2S construction funding should be coupled with more intensive education campaigns or additional construction improvements at the schools to encourage students to walk or bicycle to school.
- In general, schools should be encouraged to leverage SR2S funds by providing education that encourages students to walk and bicycle safely to and from school. Including participation in National Walk to School Day as a criterion for evaluating applications for SR2S funding is one way to couple education more tightly with the construction program.

The research team also recommends that future research should continue to track the outcome of SR2S construction programs. Such research can examine more long-term outcomes of SR2S construction. One example would be studies that would track accident rates, taking advantage of longer time series than were available at the time this evaluation was conducted.