Chapter 5
REVIEW OF IMPACTS OF TRAFFIC CALMING DEVICES

This Chapter reviews the impacts of selected traffic calming devices on traffic speed and volume, and also on collisions. The data in this Chapter comes from three sources: the recently published *Traffic Calming: State of the Practice* (1999) by Reid Ewing; the results of the Palo Alto Bryant Street Bicycle Boulevard project; and Berkeley's own Milvia Slow Street project.

The Chapter focuses on those strategies that are included in the toolbox in Chapter 4. In general, the traffic calming devices that are included in the bicycle boulevard toolbox are likely to have a small impact on traffic speeds and volumes on and near bicycle boulevards. This is in keeping with the design objective #2 from Chapter 1, which is to "minimize changes to existing traffic patterns on bicycle boulevards and adjacent residential streets." It should be noted that all of the seven bicycle boulevards now have at least one traffic diverter or barrier, and most also have speed humps. For this reason, traffic speeds and volumes were generally not identified as a high priority issue for improving bicycling conditions along most of the bicycle boulevards.

During the next phase of bicycle boulevard implementation, the City will work with neighborhoods to determine which strategies are desired for specific locations. At that time, more detailed studies will be conducted of the local impacts, if any, of the devices chosen for specific sites.

During the public workshops, some bicyclists and Bicycle Boulevard residents expressed a desire for traffic calming devices that would have more significant impacts on traffic speeds and volumes. Residents of bicycle boulevard streets, like all residents of Berkeley, may request new traffic calming devices for their streets, or alterations to existing devices. There are established procedures for some devices (such as new diverters). The procedure for requesting and installing other types of devices is being developed as the City develops a city-wide traffic calming program. Currently, the Traffic Engineering Division in the Public Works Department handles requests as they are submitted.

IMPACTS ON SPEED

Traffic calming impacts are highly variable, but it is possible to offer some generalizations, based on the Institute of Transportation Engineers' publication *Traffic Calming: State of the Practice* (1999), by Reid Ewing. According to Ewing, "speed impacts of traffic calming measures depend primarily on geometrics and spacing. Geometrics determine the speeds at which motorists travel through slow points. Spacing determines the extent to which motorists speed up between slow points." Table 5-1 shows the average speed changes associated with some of the measures that are included in the bicycle boulevard toolbox.

Table 5-1 85TH-PERCENTILE SPEED: IMPACTS DOWNSTREAM OF TRAFFIC CALMING MEASURES				
Measure	**Sample Size**	**Average Speed (mph)**	**Average Change (mph)**	**Percentage Change (%)**
Traffic circles	45	30.3	-3.9	-11
Narrowings	7	32.3	-2.6	-4

Note that these are rough estimates: standard deviations may be large, measurement methods and locations are largely uncontrolled, and some measures have small sample sizes.

Palo Alto found no significant changes in vehicle speed at four locations on its bicycle boulevard extension. Along this one and a half mile section, one full diverter was installed and forced-right turns were installed at a major street.

IMPACTS ON VOLUME

Volume impacts are even more complex and case-specific than speed impacts because they depend not only on local traffic calming, but also on the entire nearby street network, including the availability of alternative routes and the application of area-wide calming, and on the split between local and through traffic. Traffic calming measures are unlikely to affect local traffic unless they are extremely restrictive or severe. They can, however, reroute non-local traffic, either by preventing it (barriers), permitting but discouraging it (speed humps), or slowing it but causing minimal diversion (traffic circles).

Bicycle boulevards are generally associated with linear rather than area-wide traffic calming, so care must be taken not to divert excessive traffic to nearby streets. Diversion can be minimized by the proper choice of traffic calming measures, and by choosing bicycle boulevard streets near arterials that can serve vehicular traffic, as was done in Berkeley.

Table 5-2 shows the average volume changes associated with selected traffic calming measures. These should be interpreted with the same caution as the speed data.

Table 5-2 MOTOR VEHICLE TRAFFIC VOLUME: IMPACTS OF TRAFFIC CALMING MEASURES			
Measure	**Sample Size**	**Average Change in Volume (Vehicles/Day)**	**Average Change in Volume (%)**
Traffic circles	49	-293	-5
Narrowings	11	-263	-10

Street closures and diverters are the most effective methods of reducing volumes, but are not included in the toolbox. These restrictive devices can reduce traffic volumes by 35 to 45%. Street narrowings appear to have some effect in diverting traffic, while traffic circles reduce speed, but have minimal diverting effect.

Palo Alto found that traffic volume on its original bicycle boulevard remained fairly constant, except in the vicinity of two barriers, where it declined from 953 to 457 and from 481 to 170 vehicles per day. The traffic that formerly used this section was distributed among several nearby parallel streets each of which recorded increases of up to approximately 100 vehicles per day.

Berkeley reported decreases in vehicle volume from 540 to 441 and from 500 to 399 in two blocks of Milvia after traffic calming.

IMPACTS ON COLLISION RATES

Table 5-3 shows the impact of one traffic calming device, the traffic circle, on collision frequency as reported in "*Traffic Calming: State of the Practice*." These figures should again be viewed with caution.

Table 5-3
AVERAGE ANNUAL COLLISION FREQUENCY:
IMPACTS OF TRAFFIC CALMING MEASURES

Measure	Sample Size	Before Calming*	After Calming*	Percentage Change
Traffic circles (without Seattle)	17	5.89	4.24	-28
Traffic circles (with Seattle)	130	2.19	0.64	-71

* Average number of collisions per year.

Ewing reports that excluding the Seattle circles, collisions decreased after traffic calming devices were installed by about 25 percent. However, when the data is adjusted to account for the reduction in traffic volume along the streets, collisions declined only 4 percent. This indicates that the reduction in the number of vehicles on a street is what is primarily responsible for reducing collisions. Ewing also states that, "As for individual traffic calming measures, all reduce the average number of collisions on treated streets, but only 22-foot (speed) tables and traffic circles produce differences that are statistically significant. Including Seattle data, circles are by far the best performers."