

Traffic Calming Practice Revisited

SINCE THE PUBLICATION OF ITE'S TRAFFIC CALMING: STATE OF THE PRACTICE, THE FIELD OF TRAFFIC CALMING HAS MATURED. THIS FEATURE SUMMARIZES A 2004 SURVEY OF TRAFFIC CALMING PRACTICES IN 21 LEADING JURISDICTIONS. THE RESULTS ARE COMPARED TO SURVEYS CONDUCTED FOR THE NATIONAL REPORT ALMOST A DECADE AGO.

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INTRODUCTION

The authors recently conducted a survey of 21 jurisdictions across the United States with respect to their traffic calming programs. The jurisdictions were selected based upon their perceived leadership in the field. The survey was conducted for Sacramento County, CA, USA, as input in updating its traffic calming program. Table 1 summarizes the subjects covered by the survey.

This feature summarizes the range and commonality of practices followed by these jurisdictions. The commonalities suggest preferred approaches to traffic calming. The ranges represent distinct choices available to jurisdictions. Individual agency responses and a more detailed report are available at Sacramento County's Web site, www.sacdot.com/projects/NTMP/documents.asp.

In addition to summarizing the practices of the surveyed jurisdictions, this feature compares current practices to those documented previously. This survey is the first detailed look at U.S. traffic calming programs since surveys conducted for the August 1997 issue of *ITE Journal* and for *Traffic Calming: State of the Practice*, a report of the Institute of Transportation Engineers and the Federal Highway Administration.^{1,2} As such, this feature demonstrates how policies and practices have evolved as the field has matured.

WHO WAS SURVEYED

The surveyed jurisdictions were selected from a list of more than 100 jurisdictions known to have traffic calming programs. The selection was based on knowledge acquired from the *Traffic Calming: State of the Practice* project, consulting activities of the authors and a review of online information. Because the client was Sacramento County, western jurisdictions were favored in the sam-

ple selection. The 21 surveyed jurisdictions are listed in Table 2.

PROGRAMMATIC FINDINGS

Program Staffing

Engineers compose the most common professional background in the traffic calming field. Planners also are well represented. Sometimes persons from both disciplines are involved in the administration of a given program (as in Bellevue, WA, USA; Charlottesville, VA, USA; and Gwinnett County, GA, USA). Beyond program administration, engineers clearly are involved in the safety and design aspects of all programs.

Although the surveys for *Traffic Calming: State of the Practice* did not ask comprehensively about staff backgrounds, it is the authors' impression that program administration has shifted somewhat toward engineering backgrounds. If true, this could reflect the mainstreaming of traffic calming within the transportation engineering profession.

Program Budgets

The largest capital budget belongs to Sacramento, at \$600,000 per year. The typical earmarked program has a capital budget between \$100,000 and \$250,000. Several programs have no set budget, but instead compete for transportation or public works department funds generally or are funded primarily by residents on a demand basis.

Several programs operate on shoestring, including one of the best known, Portland, OR, USA, with a \$50,000 operating budget and a \$30,000 capital budget. Two programs, Eugene, OR, USA and Howard County, MD, USA, have been left unfunded by budget cuts during the recent fiscal crisis.

The success of Seattle, WA, USA, in competing for local funds was highlighted in *Traffic Calming: State of the Practice*. It was attributed both to Seattle's emphasis

Table 1. Survey structure—topics covered.

Topics covered by survey questions			
Program structure	Plan development	Installation guidelines	Design guidelines
Department lead	Initiation of action	Guidelines/warrants	Maintenance
Year started	Defining the area	Street eligibility	Signing/stripping
Staffing	Priority process	Device eligibility	Edge tapers
Staff background	Public involvement	Arterial treatments	Drainage
Program budget	Voting—when	Emergency routes	Large vehicles at circles
Neighborhood budget	Voting—area	Urban/rural issues	Who prepared designs
Resident funding	Voting—who	New developments	Americans with Disabilities Act issues
Funding sources	Voting—thresholds	Road user needs	
Use of consultants		Temporary devices	
Controversy/litigation		Monitoring of results	
		Removal of devices	

on and success in reducing traffic collisions and its combination of proactive and reactive approaches to fund allocation.

One big change since *Traffic Calming: State of the Practice* is the greater reliance on neighborhood residents to help finance their own traffic calming projects. At that earlier time, many jurisdictions had a bias against any funding mechanism that might be perceived to favor wealthy neighborhoods.

Now, perhaps due to local fiscal constraints, about half of the governments surveyed rely partially or fully on private financing: Bellevue (fully for gateway treatments but not other measures); Broward County, FL, USA (fully); Charlottesville (fully in the speed hump program); Minneapolis, MN, USA (fully); Riverside, CA, USA, (partially through a matching requirement); Seattle (partially through a matching requirement); and Portland (partially through a matching requirement that varies with need).

Vancouver, WA, has proposed a property owner purchased (POP) program. Portland soon will have three matching levels: 25, 50 and 100 percent privately funded. The private contribution can be through an up-front fee or local improvement district. Gwinnett County levies a \$12 per year maintenance fee on residents of the plan area through the county property tax.

Eugene sometimes requires residents to pay for traffic calming measures, and plans to rely more heavily in the future on local assessment districts. For speed

humps, Dallas, TX, USA, charges a resident fee, which varies according to pre-treatment roadway speeds.

Controversies and Litigation

Approximately half of the surveyed programs reported controversies. Most sounded minor and specific to individual plans (as opposed to general and spilling over to the program as a whole). The level of controversy seemed diminished compared to that reported in *Traffic Calming: State of the Practice*.

Portland, for example, had experienced controversy over emergency response and a streamlined approval process. At this time, program personnel report that “up-front public involvement has avoided significant controversy” and that “Fire Bureau concerns were solved in 1998 with new street classification Primary Emergency Response Routes.”

Up-front public involvement and avoidance of emergency routes are two ways to minimize controversy. Other reported approaches involve planning for the entire street network (not just individual streets), formalizing program policies (as opposed to more ad hoc treatment) and requiring applicants to work through neighborhood associations.

Most surveyed agencies reported either no litigation or nothing in recent years. Only three lawsuits were reported by the surveyed agencies since the publication of *Traffic Calming: State of the Practice*. One was settled out of court; the other two were decided in the cities’

Table 2. Surveyed jurisdictions.

• City of Albuquerque, NM
• City of Austin, TX
• City of Bellevue, WA
• Broward County, FL
• City of Charlotte, NC
• City of Charlottesville, VA
• City of Colorado Springs, CO
• City of Dallas, TX
• City of Eugene, OR
• Gwinnett County, GA
• Howard County, MD
• Los Angeles County, CA
• City of Minneapolis, MN
• Montgomery County, MD
• Pima County, AR
• City of Portland, OR
• City of Riverside, CA
• City of Sacramento, CA
• City of Seattle, WA
• City of Vancouver, WA
• City of Walnut Creek, CA

favor. The earlier conclusion that a carefully designed and administered program can avoid liability still seems to hold.

For old cases, see Chapter 6 of *Traffic Calming: State of the Practice*. New cases included the following: in Montgomery County, MD, a person injured on a speed hump received a \$10,000 out-of-court settlement; in Portland, a driver claiming injury due to “incomplete speed humps” lost his lawsuit; and in Seattle, the City was not held liable when a boy was hit at an intersection where a traffic circle had been requested

but not installed.

The last two suits and a threatened suit in Bellevue over the removal of speed tables illustrate an interesting trend toward litigation for failure to calm traffic rather than the misapplication of traffic calming. The decision to spend money on traffic calming or to spend money on a particular street is a discretionary function of government, not a ministerial function. As such, lawsuits over the failure to calm traffic are unlikely to be successful.

In addition to the above lawsuits, only a couple of damage claims were reported (vehicles impacting traffic calming devices). These involved small payouts.

Application in New Developments

Traffic Calming: State of the Practice foresaw a shift in emphasis from retrofits to traffic calming within new developments. This shift has occurred only to a limited degree.

Albuquerque, NM, USA; Eugene; Minneapolis; and the City of Sacramento make case-by-case recommendations as part of the development review and approval process. None reported opposition from developers. Charlotte, NC, USA and Vancouver are developing formal policies on traffic calming in new developments. Vancouver reports that developers are more receptive to traffic calming than they once were. Howard County already has such a policy in place. Slow points are required at regular intervals between 600 and 1,000 feet. Adopting formal requirements today may be the best way to avoid the need for retrofits in the future.

PROCESS ISSUES

Project Initiation

Traffic Calming: State of the Practice predicted a more proactive, staff-driven approach to project initiation in ensuing years. Instead, project initiation has remained largely reactive; projects are initiated mainly through complaints or petitions from residents. Even in Seattle, known for proactively targeting high collision locations, approximately 95 percent of projects are resident-initiated.

Within complaint-driven processes, different threshold levels of neighbor-

hood support are required before any action is taken. Some (Bellevue and Howard County) allow individuals to initiate a needs study with a phone call, written request, or online request. Others (Charlotte and Tucson, AZ, USA) require petitions signed by a specified number or percentage of residents.

Still others (Montgomery County and Vancouver) require the responsible neighborhood association (or city council member, where no association exists) to request a study. A few (Broward County and Minneapolis) first require a petition with signatures and, then, concurrence of a neighborhood association. The emphasis on neighborhood associations is a new trend since *Traffic Calming: State of the Practice*.

Priorities and Resource Allocation

The great majority of surveyed jurisdictions have adopted rating systems to determine priority among competing traffic calming projects. The reason for doing so is to achieve a degree of objectivity and effectiveness in funding decisions in the face of public demands exceeding the supply of available funds.

In Colorado Springs, CO, USA, priorities are established based on vehicle speeds; cut-through traffic volumes; collisions; proximity to schools, hospitals, or parks; and volumes of pedestrian and bicycle traffic. Charlottesville includes speed, volume, collisions and proximity to schools in its formula as well (these are the most common factors across rating systems) but replaces the remaining factors in the Colorado Springs formula with residential density, street width and absence of sidewalks.

One interesting variation on a priority rating system is Howard County's street-type priorities. Priority is assigned in the following order: school walking routes, connector or through streets and cul-de-sacs or isolated networks.

The main alternative to priority-based systems is first come, first served. This approach is taken in Gwinnett County and Minneapolis. An uncommon alternative is a lottery, used by the City of Sacramento when it first initiated its program (subsequent requests were taken in the order of application).

Public Involvement

In approximately half of the places surveyed, public involvement is limited to passing petitions, voting on plans, or voicing opinions at public hearings. The public reacts to plans but does not participate in their development. It is an up or down, go or no-go, support or oppose decision for the public.

Those agencies involving citizens in planning use one of two mechanisms: 1) Involvement occurs informally through citizen surveys to solicit ideas, meetings with staff to discuss ideas, or open houses to obtain comments on a draft plan; or 2) A formal neighborhood traffic calming committee is established to work with staff or consultants on a plan.

Since *Traffic Calming: State of the Practice*, the latter approach has gained in popularity. Practitioners include Albuquerque; Bellevue; Howard County; Los Angeles, CA, USA; Montgomery County; and the City of Sacramento.

The appropriate type of public involvement may depend on the nature of the treatment. On simple speed hump projects, Portland's staff prepares a plan and holds an open house while residents pass petitions and gather funds. On complex projects, a volunteer committee is formed and the staff acts as a consultant to the committee regarding policies and technical options.

Public Approval

With three exceptions, all surveyed jurisdictions require a vote (usually by mail) before plans are adopted and implemented. Gwinnett County and Riverside use initial petitions to judge public support for projects. The projects themselves involve only simple traffic calming devices. Charlotte also relies on petitions at present but will add a public vote on the final plan as it diversifies its program.

For the jurisdictions with voting requirements, those living in the "affected area" or the "study area" are eligible to vote. The definition of affected area differs by jurisdiction. In some jurisdictions, staff has discretion to draw boundaries subject only to general guidance.

In Los Angeles, the affected area includes but is not limited to: "proper-

ties where normal travel routes... are to be altered by the neighborhood traffic management and calming measures, and/or properties that are significantly impacted by traffic that is to be diverted."

In other jurisdictions, the affected area is defined by major physical features. In Minneapolis, it consists of all surrounding blocks bounded by through streets or other natural barriers. In still other jurisdictions, the affected area is defined as the treated street and certain connecting streets. In Montgomery County, it includes all properties that front on the street in question and cul-de-sacs and streets connecting through this street.

Typically, all residents, both property owners and renters, are eligible to vote on traffic calming plans. In about half the surveyed jurisdictions, eligibility extends to business proprietors. Every jurisdiction has its own plurality requirements for plan approval. Minimum approval rates vary from 30 percent of those voting on temporary measures in Charlottesville, to 100 percent of those voting for permanent measures paid with special assessments in Broward County. The median approval requirement for jurisdictions surveyed is two-thirds of those voting.

Some jurisdictions also have required response rates for those eligible to vote. Such requirements are imposed to ensure a degree of general public acceptance. Minimum response rates vary from 25 percent for speed control measures in the City of Sacramento to 90 percent for any measure in Los Angeles. For those jurisdictions with such requirements, the median required response rate is 50 percent (this is not an easy requirement to meet).

Road User Needs (Fire, Ambulance, Waste, Snow Removal)

Fire department interests most often are accommodated by allowing them to review and comment on traffic calming plans. This mechanism is used in at least nine of the surveyed jurisdictions. In Riverside, the fire department not only reviews and comments but also must approve speed hump installations. River-

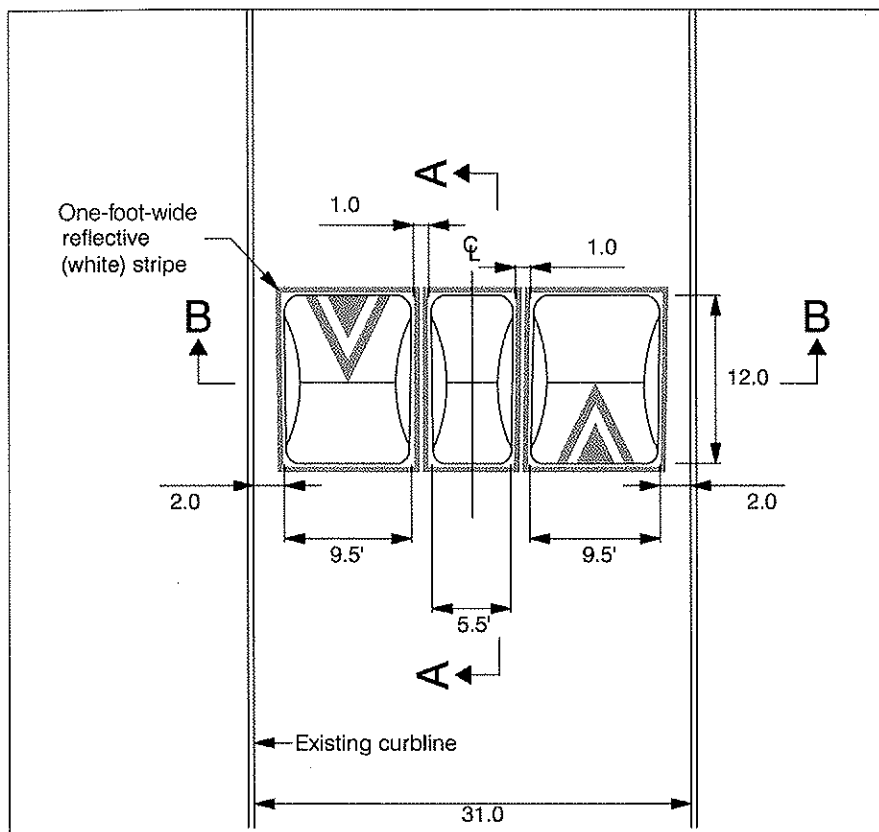


Figure 1. Example of geometric design to accommodate emergency response.

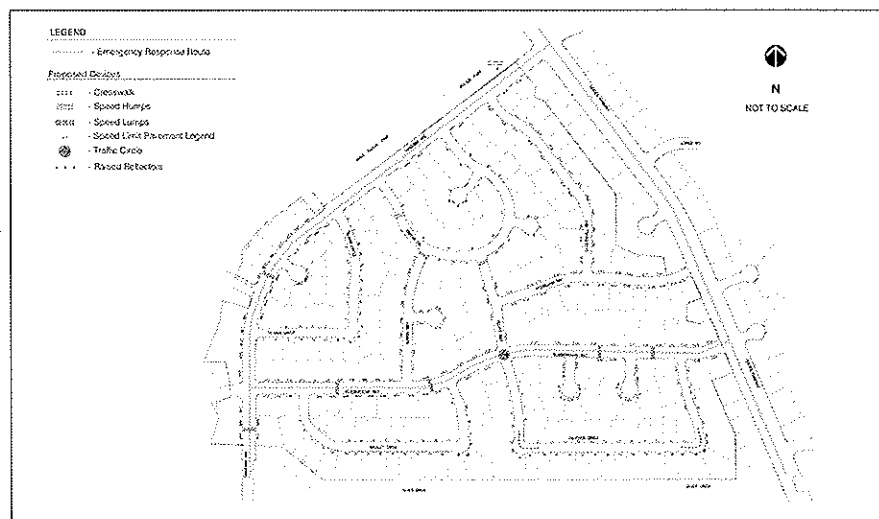


Figure 2. Primary emergency response routes with limited vertical treatments in Sacramento, CA.

side reports that the department usually grants its approval.

Another way in which fire interests are accommodated is in the geometric design of measures (see Figure 1). In this survey, only Gwinnett County mentioned selecting a speed table profile based on the needs of fire-rescue, but *Traffic Calming: State of the Practice* cites other examples from Portland, Seattle and elsewhere.

A third way in which fire interests are accommodated is the designation of primary emergency response routes, which, subsequently, are ineligible for some or all traffic calming measures. Designation of such routes ended the moratorium on traffic calming in Portland. Primary emergency response routes in the City of Sacramento limit the use of vertical devices to speed lumps.

Traffic calming on major streets

Traffic calming device	Major arterial	Minor arterial	Major collector	Neighborhood collector
Roundabouts	Yes	Yes	Yes	Yes
Traffic circles	No	No	No	Yes
Raised crosswalks	No	No	Yes	Yes
Curb extensions	No	Yes	Yes	Yes
Parking bays	Yes	Yes	Yes	Yes
Chicanes	No	Yes	Yes	Yes
Street closure	No	No	No	No
Half diverter	No	No	No	No
Diagonal diverter	No	No	No	No
Star diverter	No	No	No	No
Raised median	Yes	Yes	Yes	Yes
Pavement surface modification	Yes	Yes	Yes	Yes
Speed actuated signing	No	No	No	No
Speed humps	No	No	No	No
Speed tables	No	No	No	Yes
Landscaped roadway	Yes	Yes	Yes	Yes
Midblock neckdown	No	No	Yes	Yes
Angled slow point with median	No	No	Yes	Yes

Figure 3. Eligible and ineligible devices on major streets in Eugene, OR.

Figure 2 illustrates the primary emergency response routes and proposed traffic calming devices of a local neighborhood traffic management plan. Conversely, Vancouver avoids placing traffic calming devices on primary emergency response routes and, in addition, seeks to make street connections that provide alternate routes to fire emergencies.

Chapter 7 of *Traffic Calming: State of the Practice* reports other approaches to reconciling traffic calming and emergency response goals, including the use of experimental measures such as speed cushions and split humps.

Medical emergency responders are accommodated in the same way as fire responders. They often are one and the same; fire-rescue operations provide emergency medical services and fire engines often are first on the scene at medical emergencies. Three jurisdictions reported that ambulance services, in particular, are considered secondary to fire services and are given less priority in traffic calming plans.

Waste collection either is not considered at all or is accommodated indirectly through planning for fire response. In Portland, the SU-30 design vehicle is used to design traffic calming devices for waste collection; larger vehicles are used for fire response.

Snow clearance is a separate issue, but one that creates few problems due to the mild climates of most surveyed jurisdictions. Minneapolis and Eugene, two areas that get some snow, report that they typically do not apply traffic calming to primary snow removal routes.

Based on surveys of Toronto, Canada; Dayton, OH, USA; Yakima, WA; and other northern cities, Chapter 7 of *Traffic Calming: State of the Practice* reports various approaches to reconciling conflicts between snow clearance and traffic calming, such as using specialized equipment or installing object markers that extend above snow levels.

TECHNICAL ISSUES

Street Eligibility

Surveyed jurisdictions vary in the types of streets eligible for traffic calming. Some, such as Broward County and Seattle, limit traffic calming to local streets. More jurisdictions, including Albuquerque, Montgomery County and Portland, extend eligibility to collector streets.

Traffic Calming: State of the Practice predicted an expansion of U.S. programs to streets higher up the functional hierarchy. To a limited degree, this has occurred. Six surveyed jurisdictions—Bellevue, Charlottesville, Eugene, Howard County, Portland and Vancou-

ver—indicated that they would consider treating arterials for speed problems. None of these agencies would install vertical measures on a street. The City of Eugene allows for roundabouts, parking bays, raised medians, surface markings and landscaping (see Figure 3). Two surveyed agencies have experimented with signal timing to slow speeds.

Almost half of surveyed jurisdictions limit traffic calming to residential streets. Among them are Albuquerque, Charlotte, Gwinnett County, Los Angeles and Riverside.

GUIDELINES/WARRANTS FOR DEVICE ELIGIBILITY

More than half of the surveyed jurisdictions have warrants or guidelines for the installation of different traffic calming measures. Warrants are minimum requirements that must be met before individual measures are installed; guidelines are advisory and context-sensitive. The national trend has been away from warrants and toward guidelines, with the exception of speed humps, which typically are governed by warrants for historical reasons.

In Seattle, speed humps are warranted only for local streets with 85th-percentile speeds of 35 miles per hour (mph) or greater and traffic volumes of 400 vehicles per day or higher. In Riverside, the minimum qualifying 85th-percentile speed is 6 mph over the speed limit and the minimum qualifying traffic volume is 500 vehicles per day. Dallas requires traffic volumes to be less than 6,000 vehicles per day and 85th-percentile speeds to be in excess of 35 mph.

Guidelines often address the selection of a device in consideration of several factors: the type of problem, the location (intersection, mid-block, school, etc.) and street type (local, collector, arterial). Bellevue, Charlotte, Minneapolis, Portland and Vancouver have guidelines for their different measures based upon criteria such as 85th-percentile speed and daily traffic volume.

Toolboxes

Two surveyed jurisdictions have small traffic calming toolboxes. Although it has experimented with other measures,

Gwinnett County has settled on 22-foot speed tables as the tool of choice. Riverside currently uses only speed humps and STOP signs.

Many jurisdictions have large toolboxes but limit specific tools to certain street types. Howard County has a large toolbox for local streets but limits major collectors to re-stripping, roundabouts, chokers and medians (and, then, only if enforcement and education have proven ineffective). Vancouver is similar with respect to local streets, but limits arterials to landscaping, high visibility striping, roundabouts, chokers, medians and photo enforcement. Portland excludes volume control measures such as partial closures from neighborhood collectors. Eugene excludes speed humps; Charlottesville excludes all vertical measures from collectors and arterials.

Most jurisdictions are open to new ideas and experiments but few have identified good candidate devices. Bellevue has a \$50,000 annual budget toward the development of new devices. Two respondents reported experimenting with measures that are new to them but were developed decades ago and were in regular use at the time of *Traffic Calming: State of the Practice*. Charlottesville has built its first diagonal diverter and Sacramento its first raised crosswalk.

CONCLUSIONS

Figure 4 summarizes the findings from the 2004 survey. Since *Traffic Calming: State of the Practice*, the field of traffic calming has matured. Some of the most significant changes include: mainstreaming of programs within transportation or public works departments; less apparent public controversy surrounding programs; greater reliance on private financing of construction; more public involvement in planning through neighborhood traffic committees; limited expansion of eligibility beyond local streets to collectors and arterials; and expansion of individual agency toolboxes to include a greater range of speed control measures.

Policies and practices that have not changed significantly since *Traffic*

Summary of practices (based upon survey of 21 agencies)	
Issue	Findings
Program budget	Program capital budgets range from \$30,000 to \$600,000 per year. Of the agencies surveyed, approximately 50 percent either are unfunded or rely exclusively on resident funding.
Resident funding	Approximately half of the agencies rely on residents to fund some or all of the construction costs.
Installed with new development	Approximately half of the agencies incorporate traffic calming devices into new developments. Two agencies have adopted guidelines for traffic calming in new developments.
Public involvement	All agencies surveyed rely on resident or neighborhood associations to submit petitions requesting treatment. Some agencies also would consider staff or commission appointed petitions. More than half involve the public through a committee or neighborhood association to help develop a plan.
Fire department involvement	All of the agencies surveyed involve the fire department in the design of the available devices and/or during the plan development process. Some agencies give veto power to the fire department. Several agencies have designated primary emergency response routes that preclude certain types of treatments.
Treatment of arterials	Six of the surveyed agencies consider treating arterials, with a limited toolbox of eligible devices. None of these agencies allow the use of vertical devices on arterials.
Priorities	In total, 75 percent of the agencies rely on some form of a quantifiable priority ranking system to determine priorities. Some agencies treat problems in the order petitions are received; two agencies rely on resident funding and, therefore, no prioritizing system is needed.
Device eligibility	A majority of agencies use warrants or guidelines to determine device eligibility; the remaining eight agencies rely on a staff determination.
Toolbox	All but two of the agencies have comprehensive toolboxes. Almost half of the agencies reject STOP signs as a traffic calming devices.

Figure 4. Summary of practices.

Calming: State of the Practice include: relatively small budgets and staffs; minimal litigation and few paid damage claims; preference for in-house planning and design; project initiation largely in reaction to citizen complaints; near universal reliance on petitions and/or balloting to judge public support for projects; accommodation of fire-rescue agencies; use of priority rating systems to allocate scarce resources; and limited innovation in the nature of devices.

ACKNOWLEDGMENTS

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References

1. Ewing, R. and C. Kooshian. "U.S. Experience with Traffic Calming." *ITE Journal*, Vol. 8, No. 7 (August 1997): 28-33.

ITE RESPONDS: HURRICANES KATRINA & RITA

ITE's International Board of Direction would like to express its heartfelt sympathy to all the victims of Hurricanes Katrina and Rita. Among these victims are many ITE members. We strongly encourage all ITE members who have the means to contribute to the relief effort. The magnitude of the effort and resources required to clean up and rebuild the Gulf Coast is staggering.

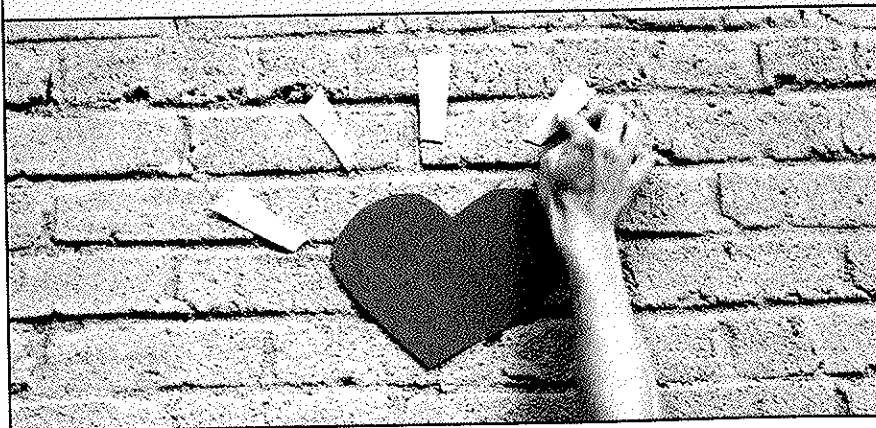
WHAT CAN ITE DO? ITE has announced a program for ITE members who have been impacted by Hurricanes Katrina and Rita and who need temporary employment or wish to relocate permanently. ITE will match these members with employers seeking employees. We request that those seeking such employment opportunities send their resumes and a cover letter indicating the following:

1. Are you seeking temporary or short-term employment?
2. If you are seeking short-term employment, in what city and state?
3. If you are seeking to relocate, to where are you interested in relocating?

We request from prospective employers an expression of interest in being sent the resumes we receive for consideration.

For members from the area affected by Katrina or Rita, ITE will replace, at no cost, any membership and/or Professional Traffic Operations Engineer™ certificates and receipts for ITE International that may have been destroyed or damaged. ITE further extends the offer to replace ITE publications at our cost, plus shipping.

Please e-mail correspondence concerning these programs to katrinaresponse@ite.org or mail to:
Katrina Response
Institute of Transportation Engineers
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438 USA



2. Ewing, R. *Traffic Calming: State of the Practice*. Washington, DC, USA: Institute of Transportation Engineers/Federal Highway Administration, 1999.



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