

NEIGHBORHOOD TRAFFIC CALMING MANUAL



**City of Palm Springs
Engineering Services Department**

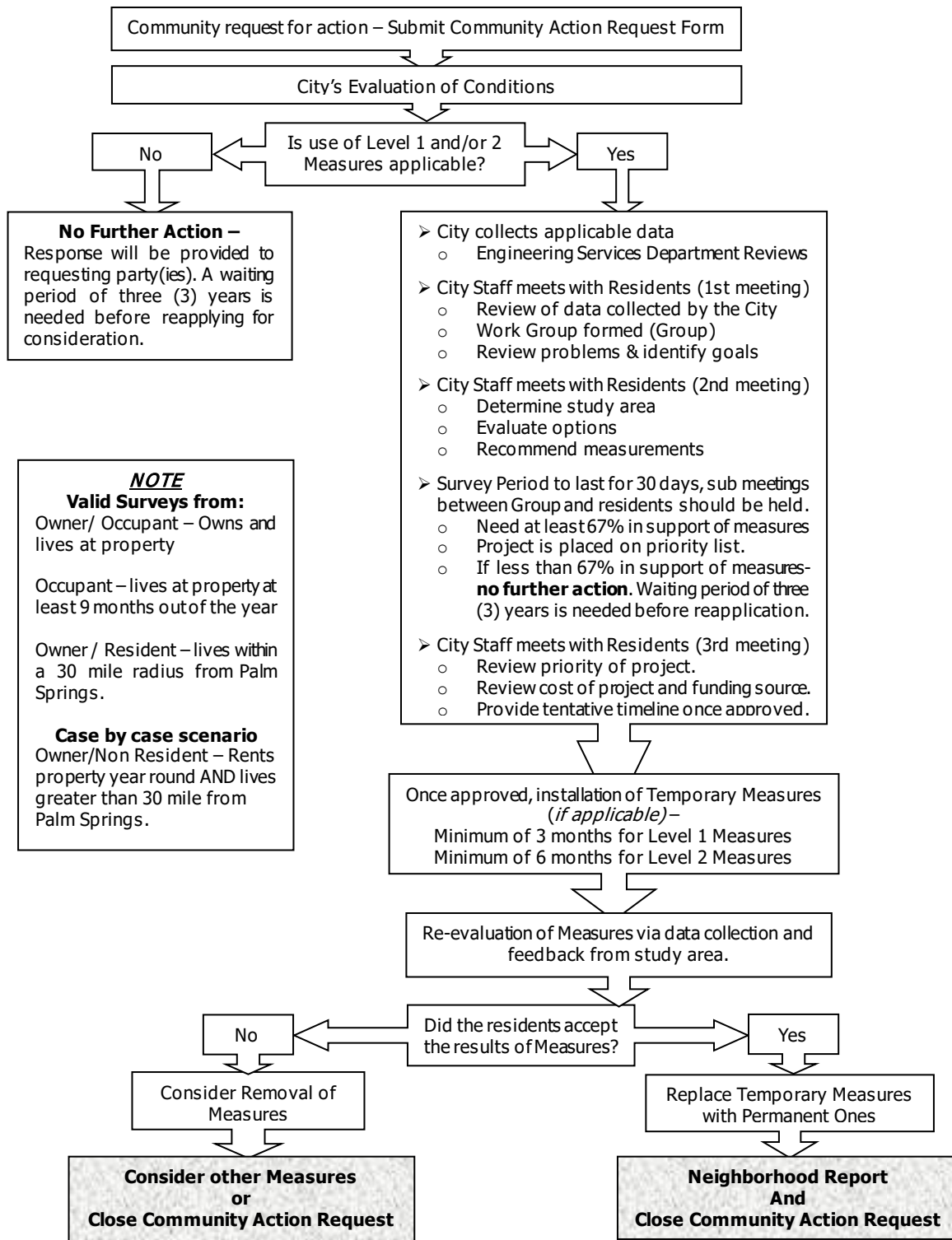
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Implementation Flow Chart



Community Action Request Form

The purpose of the Community Action Request Form (CARF) is to enable residents to share their neighborhood traffic safety concerns in accordance with the City of Palm Springs' Neighborhood Traffic Calming Policy. Please fill out and submit the form with as much detail as possible, including contact information for at least five neighbors (residents and/or homeowners) in support of this request and potentially willing to be part of the work group. These requests will be reviewed, and recommendations provided back to you. Please note this request is for residential streets only and doesn't include arterials (e.g. E Ramon Rd, E Palm Canyon, etc.).

After completing this form, please submit it to Diana.Shay@palmsspringsca.gov. If you have any questions regarding the completion of this form, contact Diana at the email above or 760-323-8253.

Name: _____ Date: _____

Location of concern (include cross street or street extents if one or more street segments):

What are your specific traffic safety concerns about the above location?

What traffic calming measures (e.g. speed feedback signs, speed humps, striping changes) are you requesting? Not sure? That's okay too.

Provide the name, address and email or phone number of at least five (5) people who agree with the above concerns and who reside at different households within the effected neighborhood.

<u>Your Name (Work Group Leader)</u>	<u>Address</u>	<u>Email</u>	<u>Phone Number</u>
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<u>Neighborhood Supporters</u>	<u>Address</u>	<u>Email</u>	<u>Phone Number</u>
--------------------------------	----------------	--------------	---------------------

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

You may place additional names on an additional sheet of paper.



Chapter 1. - Introduction

What is Traffic Calming?

The City of Palm Springs periodically receives concerns from its residents about speeding, cut-through traffic, and various other issues related to driving. Without proper treatment, neighborhood livability will become more adversely affected. In response to the public's concerns, the City of Palm Springs has developed a Neighborhood Traffic Calming Program. The main goal of the City's Traffic calming program is to:

- Provide a systematic approach.
- Provide a communication structure.
- Gather data and support to determine the best course of action.

Multiple Purposes of Traffic Calming

The immediate purpose of traffic calming is to reduce the speed and volume of traffic to acceptable levels. Reductions in traffic speed and volume, however, are just means to other ends such as traffic safety and active street life. Traffic calming is undertaken for many different reasons, including:

- Providing safer environment for pedestrians
- Reducing the occurrence of excessive speeding
- Reducing truck traffic
- Reducing noise, vibration, and air pollution
- Reducing through traffic and accidents
- Supporting redevelopment

Note that stop signs, curb painting, and crosswalk installations (non-raised) are traditionally not considered traffic calming devices. For uniformity, the process to request installation of subject items will still require submission of a Community Action Request Form.

An Integrated Approach to Traffic Calming

The City of Palm Springs' Traffic Calming Program addresses many traffic related issues by working closely with residents to identify existing problems, define neighborhood goals, and garner community support. The program relies heavily on community participation and action. After development of a community-driven neighborhood traffic-calming plan, actions may be implemented using a staged approach.

After the identification of a neighborhood problem, City staff and residents use an integrated approach to develop reasonable measures that consider the "4Es":



- **Education:** Residents are provided with information/ tools necessary to make informed decisions.
- **Enforcement:** Community identified strategies which can be put into effect through targeted traffic enforcement.
- **Engineering:** Through City staff and resident partnership, physical traffic calming strategies are developed based on engineering principles, community input, and financial feasibility.
- **Enhancement:** Design and landscaping features can be used to improve the aesthetics and livability of neighborhoods and to enhance many physical measures.

Level 1 measures consist of easily implementable, low-cost, and often less controversial tools such as neighborhood traffic safety campaigns, radar speed display units, neighborhood speed watch programs, targeted police enforcement, sign installation, and pavement marking changes. Level 1 actions may be implemented first.

Level 2 actions alter the configuration of neighborhood streets, so they often require engineering, are higher-cost, and require community consensus prior to installation. Level 2 measures consist of physical devices such as speed humps, traffic circles, curb extensions, median islands, and other measures described within this Policy.

Design considerations will meet the minimum criteria to be effective for the intended results. Request for additional visual aesthetics, be it architectural or artistic, will not be considered, unless funded by the community and approved by the City Engineer as meeting compliance with current City Design Standards.

Future Program Updates

The City of Palm Springs' Neighborhood Traffic Calming Program is considered a living document. It will be updated from time to time as new traffic calming techniques are developed and tested. As the City's neighborhoods gain more experience with traffic calming, procedures may be revised. In addition, traffic calming device installation guidelines will be added as they are developed.



Chapter 2. - Implementation Process

The City of Palm Springs' Neighborhood Traffic Calming Program is based on substantial community participation. Because residents are primarily the initiators of traffic calming requests and must live day-to-day with the resulting actions, the City includes neighborhood participation throughout the process. Development of successful traffic calming programs depends on a strong interaction between the community and City staff.

One of the intents of the program is to provide a clear structure for addressing traffic concerns in the City's neighborhoods. Traffic concerns may exist throughout an entire neighborhood, or may be specific to a particular street, segment of roadway, or at a spot location. Both levels require, as a first step, community or City staff identification of existing problems.

Community Identification of the Problem and Consensus

The traffic calming process begins once City Staff receives a request from a neighborhood to initiate a study or the Department identifies a traffic problem through its regular review of traffic statistics. In the case of a neighborhood-initiated request, a resident or a group of residents must complete a Community Action Request form.

The form must include a discussion of the current traffic problems and the names and signatures of at least five other affected property owners supporting the request to initiate a study. A Community Action Request form is provided within this chapter. The requesting party(ies) may be charged a \$75.00 fee per traffic survey location. Upon receipt of the Community Action Request form, the City's Department Engineering Services will:

- Set up a meeting with the requesting parties and get a consensus of the neighborhood concern and their ideal solution.
- Conduct a field visit, and collect data, as appropriate (e.g., traffic volumes, collision data, travel speeds, etc.).
- After data collection, City staff will evaluate the need for traffic calming:
 - If the need for traffic calming is not supported by the data collected, a report will be issued to the requesting party(ies).
 - If traffic calming is supported by the data, a second meeting will be held with the requesting party(ies) to discuss the finding(s), recommendations, and form a neighborhood working group (referred now as the "Group"). The Group will work with City staff to identify the limits of the study area (survey zone) and the most effective solutions to the identified problem. Note that the study zone must take into account potentially affected streets and residents, not just the specific street and side.



- Once the study area is defined, a survey will be conducted via mail. The survey period will last for 30-days to allow for maximum feedback and will be counted the following day.
- At least 67% of the votes received from the study zone must be in-favor to move forward with proposed mitigation measures. If at least 67% support is NOT received, the project will NOT move forward and a waiting period of three (3) years is needed before reapplying for consideration.
 - Example: for a study zone that contains 100 houses, 67 in-favor votes must be received by the City to move forward.

The Group will be responsible for arranging subsequent meetings and shall keep their neighborhood constituents informed as to progress. It will be the responsibility of the Group to gather enough support and encourage as much participation during the survey period. Once solution consensus is reached, the project will be placed on a list for prioritization.

The prioritization process provides the City with clear guidelines on how to manage its limited resources effectively and appropriately when dealing with citywide traffic calming needs. The appropriate improvements will be prioritized for installation in accordance with the Council approved Capital Improvement budget. If the mitigation measures do not receive enough votes, the proposed measures will not be installed. The community may re-apply for a traffic calming plan in three years or sooner if special circumstances indicate that further review should be considered.

Level 1 Implementation Process

If City staff determines that the neighborhood's identified problem can be easily reduced or alleviated with a Level 1 action, the City will propose implementation of the most appropriate Level 1 improvement(s) at a neighborhood meeting. This procedure will also serve as the first step in the case of a Department identified problem. If applicable, temporary devices will be installed for a period of 3 months. If the prescribed actions have proven effective in addressing the goals (via data collection), the improvements will stay in place or permanent devices will be installed. If the actions are ineffective, Level 2 measures will be evaluated.

Level 2 Implementation Process

In special circumstances, City staff may determine that Level 1 measures cannot achieve the desired outcomes and may recommend immediate consideration of Level 2 measures. Projects that move into Level 2 Measures will require greater community/resident participation and will adhere to the same process as described in the Community Identification of the Problem and Consensus.



If applicable, temporary devices will be installed for a period of 6 months. If the prescribed actions have proven effective in addressing the goals (via data collection), the improvements will stay in place or permanent devices will be installed. City staff will give notification to the neighborhood prior to construction. City staff will prepare a report of the findings for presentation to the neighborhood. Depending on the nature of the measures, this report could include a maintenance plan for residents and property owners.

Level 1 & 2 Design Considerations

Design considerations will meet the minimum criteria to be effective for the intended results. Request for additional visual aesthetics, be it architectural or artistic, will not be considered, unless funded by the community.

Funding Considerations

Funding for the implementation of a traffic calming plan should be considered throughout the plan development process. If funding limitations will impact the range of options available, this needs to be identified early in the process and the variety of appropriate devices should reflect these limitations. It must be reiterated that Level 2 devices are expensive. Furthermore, the City's Neighborhood Traffic Calming Program operates on a limited budget. The budget is approved annually and is contained in the City's Capital Improvement Program.

However, if a neighborhood wants to implement a more extensive plan than what City Staff believes is appropriate to resolve the identified problem(s), then the City Council may need to approve the plan with additional funds and/or the neighborhood may request to participate in funding all or a part of the project. Project for which a 100% funding commitment by the neighborhood is received will be moved forward to implementation by the City upon completion of the design process.



Chapter 3. - Guidelines for Installation

The City of Palm Springs will continually develop recommended guidelines for the installation of various traffic calming tools. The guidelines discussed below can be used in most circumstances; however, special situations may sometimes apply since many streets have differing characteristics.

Speed Hump and Speed Cushion Guidelines

The following guidelines should be followed when considering the installation of speed humps:

- The street or street segment shall be a two lane residential local or collector street, not found on the State or California's functional classification maps, where its primary function is to provide access to abutting residences.
- The street or segment shall be fully improved, i.e. includes curb and gutter or curb and gutter shall be constructed as part of the project that constructed the humps or cushions. Streets without full improvements may be considered if physical conditions exist that will allow the humps or cushions to operate effectively.
- The street segment shall be at least 600' long.
- The installation of humps or cushions shall not adversely affect response time for emergency service vehicles. City Staff in conjunction with potentially affected Public Safety Departments shall determine if there is any affect to existing response times.
- Guidelines apply to streets with a speed limit of 30 miles per hour or less.
- The critical speed (i.e. the 85th% speed) should be at least seven miles per hour over the speed limit.
- At least 50% of the traffic should exceed the speed limit.
- The average daily traffic volume should be more than 500 vehicles per day, but less than 3,000 vehicles per day.

Crosswalk Guidelines

Crosswalks shall not be installed unless the location demonstrates a high concentration of pedestrians and shall be installed in conjunction with traffic control devices such as traffic signs. New crosswalks at uncontrolled intersection or mid-block locations shall be strictly limited and shall be allowed only in the most urgent circumstances and if pedestrian safety can be provided.



Curb Marking Guidelines

Per City Chapter 12.32, The City Engineer is authorized to place, and when required, shall place curb markings to indicate parking or standing regulations. Upon receiving request for curb markings (Community Action Request Form), a field visit will be conducted by City Staff, and information relayed to the City Engineer. If curb marking is warranted, an internal work order will be created and submitted to Department of Maintenance and Facilities who will complete the work. If a single property is having issues such as mail not being delivered or cars encroaching into a driveway due to no red curb, only one signature is required to be submitted.

Stop Sign Guidelines

Stop sign installation shall be guided by the MUTCD stop sign warrants Criteria. According to the MUTCD, the warrants for placing multiway stop signs are as follows:

- Where traffic signals are going to be placed soon and the intersection needs a temporary solution to control the traffic;
- An intersection that has several crashes (≥ 5 correctable collisions in 12 months);
- When an intersection has the following traffic volumes:
 - The total volume of traffic entering the intersection from all approaches must average at least 500 vehicles per hour for any eight hours of an average day;
 - The combined vehicular and pedestrian volume that enters the intersection from the minor street must average at least 200 units per hour for the same eight hours, with an average delay to the minor street traffic of at least 30 seconds per vehicle during the maximum hour;
 - The 85th percentile approach speed (this is the speed at or below which 85 percent of the vehicles travel on a given roadway) of the major street traffic exceeds 40 miles per hour, and the minimum vehicular volume warrant is 70 percent of the above requirements.

Speed Reduction Guidelines

Setting the speed limits can be controversial and requires a rational and defensible determination to maintain public confidence. The steps in setting speed limits include planning, coordination, data collection, analysis, and finally, determination of the speed limits. The City of Palm Springs approaches to speed limit setting are based on the 85th percentile speed—the speed at which 85 percent of free-flowing traffic is traveling at or below. Other than maximum speed limits applicable to a particular class of road, such as freeways or city streets, that is established by State law, altered speed zones are based



on engineering and traffic studies.

Based on the 85th percentile, speed can be adjusted to the nearest 5 mph increment and may be rounded up or down. For example:

- If the 85th percentile speed in a speed survey was 37 mph, then the speed limit would be established at 35 mph since it's the closest 5 mph increment. If deemed appropriate by engineering judgment, the speed survey, and approved by a registered Civil or Traffic Engineer, the speed can be lowered to 30 mph.
- If the 85th percentile speed in a speed survey was 33 mph, then the speed limit would be established at 35 mph since it's the closest 5 mph increment. Additional, instead of rounding up to 35 mph, the speed limit can be established at 30 mph, but no further reductions can be applied.

For the setting speed zones, The City of Palm Springs also observes the California Vehicle Code (CVC) Division 1, Sections 235 and 515, as well as Division 11, Chapter 7 which defines the California Speed Laws.

Round-About / Traffic Circles Guidelines

Traffic circles are raised circular islands in an intersection. Speed reduction at roundabouts is caused by geometry rather than by traffic control devices or traffic volume. Consequently, speed reduction can be realized at all times of day and on streets of any traffic volume. It is difficult to speed through an appropriately designed roundabout with raised channelization that forces vehicles to physically change direction. In this way, roundabouts can complement other traffic calming measures. Roundabouts have also been used successfully at the interface between rural and urban areas where speed limits change. In these applications, the traffic calming effects of roundabouts force drivers to slow and reinforce the notion of a significant change in the driving environment. It should be noted that traffic circles can have an adverse effect to pedestrian and bicyclist safety and are more expensive to construct.

While there might not be a specified guideline to the construction of a traffic circles, The Federal Highway Administration (FWA) provides an information guide and items to consider for an effective design and use of a traffic circle. The document is titled "Roundabouts: An Informational Guide". Please refer to the following link for more information: <https://www.fhwa.dot.gov/publications/research/safety/00067/00067.pdf>



Chapter 4. - Traffic Calming Impacts

This chapter describes impacts of different types of traffic calming measures. Using qualitative and quantitative data available from before-and-after studies, the ability of various Level 2 devices to reduce travel speeds, cut-through traffic volumes, and collision potentials are discussed. In addition, the impact of traffic calming measures on emergency responsiveness is presented. Level 1 impacts are not discussed since very few before-and-after studies have been conducted on these type of traffic calming improvements.

Travel Speeds

One of the primary goals of traffic calming is to reduce travel speeds on residential streets. In traffic engineering, speed distributions are typically represented by 85th percentile speeds since most studies show that at least 85 percent of the drivers operate at speeds which are reasonable and prudent for the conditions relative in each situation. Most of the speed data available from before-and-after studies of traffic calming are 85th percentile speeds.

Table 2.1 summarizes the speed impacts of various traffic calming measures. The data shown in the table are based on the results of hundreds of before-and-after studies.

Table 2.1 Speed Impacts Downstream of Traffic Calming Measures

Sample Measure	Sample Size	85 th Percentile Speed (mph)			Percentage Change*
		Avg. Before Calming	Avg. After Calming	Change After Calming	
Speed Hump	179	35.0	27.4 (4.0)	-7.6 (3.5)	-22 (9)
Raised Crosswalk	58	36.7	30.1 (2.7)	-6.6 (3.2)	-18 (8)
Raised Intersection	3	34.6	34.3 (6.0)	-0.3 (3.8)	-1 (10)
Traffic Circle	45	34.2	30.3 (4.4)	-3.9 (3.2)	-11 (10)
Narrowing	7	34.9	32.3 (2.8)	-2.6 (5.5)	-4 (22)
Entrance Barrier	16	32.3	26.3 (5.2)	-6.0 (5.2)	-19 (11)
Diagonal Diverter	7	29.3	27.9 (5.2)	-1.4 (4.7)	-4 (17)

Source: "Traffic Calming, State of the Practice," ITE, August 1999, reverified June 2018.
Measurements within the parentheses represent the standard deviation from the average.

As shown in Table 2.1, speed humps have the greatest impact on 85th percentile speeds, reducing them by an average of more than seven miles per hour (mph), or 20 percent. Raised intersections and traffic circles have the least impact. It should be noted that the speed impacts of traffic calming measures rely not only on the geometrics of the device, but the spacing between successive devices. Previous studies indicate that speeds increase about 0.5 to 1.0 mph for every 100 feet of separation for speed hump spacing up to 1,000 feet.



Traffic Volumes

Another primary goal of traffic calming is to reduce cut-through traffic volumes on residential streets. Traffic volume impacts are much more complex and site-specific as compared to speed impacts because of the availability of alternative routes and the split of traffic between localized trips (that need to travel along the traffic calmed location) and through traffic (which can often take another route).

Although traffic volume changes are difficult to assess, based on previous studies, two measures of impact are summarized in Table 2.2. The table provides information on average percentage change in daily traffic volumes after treatment. The results shown in Table 2.2 should be viewed as representative only.

Table 2.2 Speed Impacts Downstream of Traffic Calming Measures

Sample Measure	Sample Size	Average Percent Change in Volume* (vehicles per day)
Speed Humps	143	-18 (24)
Raised Crosswalks	46	-12 (20)
Traffic Circle	49	-5 (46)
Narrowing	11	-10 (51)
Entrance Barrier	53	-42 (41)
Diagonal Diverter	27	-35 (46)
Full Closure	19	-44 (36)

Source: "Traffic Calming, State of the Practice," ITE, August 1999., Verified June 18, 2018
Measurements within the parentheses represent the standard deviation from the average.

Traffic volume changes are usually the greatest when roadway closure devices are used, such as entrance barriers, diagonal diverters and cul-de-sacs. Of Level 2 measures, traffic circles typically have the least effect in reducing traffic volumes.

It should also be pointed out that while implementation of certain traffic calming devices can reduce traffic volumes along the intended route, they may also increase traffic volumes along nearby residential streets. This potential impact should be considered before deciding on which traffic calming tools are to be implemented.

Collisions

By slowing traffic, eliminating conflicting movements, and increasing drivers' attention, traffic calming can result in fewer collisions. And, due to lower speeds, they are often less serious when collisions do occur. Table 2.3 compares before-and-after collision frequencies for various Level 2 traffic calming measures. As shown, several traffic calming devices reduce the potential for collisions. Traffic circles are very effective as they lower the number of potential vehicle conflict points (since no left-turn or straight-through movements are allowed).



Table 2.3 Average Annual Collision Frequencies Before and After Traffic Calming

Sample Measure	Sample Size	Average Annual Collisions		
		Before Calming	After Calming	Percentage Change
Speed Hump	50	2.62	2.29	-13
Raised Crosswalk	8	6.71	3.66	-45
Traffic Circle	130	2.19	.064	-71

Source: Unpublished documents supplied by traffic calming programs.

Many traffic calming measures not only reduce the potential for collisions between two or more vehicles, but also between vehicles and pedestrians or between vehicles and bicyclists. Several treatments improve the sight distance between these modes, and/or provide safe refuge areas for crossing pedestrians and bicyclists. On the other hand, some measures that reduce travel lane widths could increase the potential for conflicts between vehicles and bicyclists.

Emergency Responsiveness

Many traffic calming tools that are effective due to their ability to physically control traffic circulation can also negatively impact several classes of emergency vehicles. The City of Palm Springs and its residents place a very high priority on minimizing emergency response time. Several localities have performed controlled tests of speed humps, raised crosswalks, and traffic circles to see how much delay they produce. Table 2.4 on the next pages presents the test results.

Table 2.4 Emergency Response Time Studies Results

Community	Measure	Delay at Slow Point (seconds)
Austin, TX	12' Speed Hump	2.8 (fire engine) 3.0 (ladder truck) 2.3 (ambulance w/outpatient) 9.7 (ambulance with patient)
Berkeley, CA	12' Speed Hump	10.7 (fire engine) 9.2 (ladder truck) 3.0 (fire engine)
	22' Raised Crosswalk	13.5 (ladder truck)
Boulder, CO	12' Speed Hump	2.8 (fire truck)
	25' Traffic Circle	7.5 (fire engine)
Montgomery Co., MD	12' Speed Hump	2.8 (ladder truck) 3.8 (ambulance) 4.2 (fire truck) 5.4 (ladder truck)
	18' Traffic Circle	3.2 (ambulance) 5.0 (fire truck) 7.0 (pumper truck)
Portland, OR*	14' Speed Hump	5.2 (fire engine) 2.9 (custom rescue vehicle) 6.6 (ladder truck)
	22' Raised Crosswalk	3.0 (fire engine) 0.3 (custom rescue vehicle)
		3.0 (ladder truck) 6.1 (fire engine) 3.1 (custom rescue vehicle)
16' – 24' Traffic Circle	8.4 (ladder truck)	
Sarasota, FL	12' Speed Hump	9.5 (ambulance)

*Assumes a 35-mph response cruising speed., Source: "Traffic Calming, State of the Practice," ITE, August 1999.



As shown in Table 2.4, regardless of the traffic calming measure or fire-rescue vehicle, the delay per traffic calming measure is often under 10 seconds. Traffic circles appear to create longer delays than speed humps, but speed humps have a greater probability of damage to fire-rescue vehicles and injury to patients in ambulances. Finally, raised crosswalks, because they are longer, create shorter delays than speed humps.

Consideration of traffic calming devices will always include a review of possible negative impacts, including emergency response times as well as possible liability issues.



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Application of Tools

It is important to recognize that if cut-through traffic is the problem (as determined by traffic counts), it suggests one set of measures. If speeding is the problem (as determined by speed measurement), it suggests another set. High collision rates, crime, or urban blight may suggest a third set. The following Table provides a general assessment of traffic calming measures. Chapter 4 provides more specific detail on how various traffic calming tools affect traffic speed and volumes, vehicle collisions, and other quality of life measures.

Generalized Assessment of Traffic Calming Measures

Measure	Reduces Speed	Reduces Traffic	Noise	Loss of Parking	Restricts Access	Emergency Impacts	Maint.	Estimated Cost
Level 1 Measures:								
Speed Display	Maybe	No	No Change	None	None	None	No	\$250/ Day
Neighborhood Signs	Maybe	Minimal	No Change	None	None	None	Occasional	\$200/ Sign
High Visibility Crosswalks	Maybe	No	No Change	None	None	None	Yes	\$1-5K
Police Enforcement	Yes	Maybe	No Change	None	None	None	No	\$75/Hr
Narrowing Lanes	Yes	Maybe	No Change	None	None	None	Yes	\$1-3K
Speed Limits Signing	Maybe	No	No Change	None	None	None	Occasional	\$200/ Sign
Stop Signs	No	Maybe	Increase	None	None	Yes	Occasional	\$200/ Sign
Signed Restrictions	No	Yes	No Change	None	Yes	Maybe	Occasional	\$200/ Sign
Level 2 Measures:								
Median Island	Yes	Maybe	Decrease	Yes	Yes	Yes	Yes	\$10-75K
Gateway	Yes	Yes	Varies	Maybe	Yes	None	Yes	\$10-20K
Curb Extensions	Yes	No	No Change	Yes	None	Some	Yes	\$10-20K
Chokers	Yes	Maybe	No Change	Yes	None	Some	Yes	\$10K
Speed Humps/Cushions	Yes	Maybe	Increase	None	None	Yes	Yes*	\$3-5K
Raised Crosswalk	Yes	Maybe	Increase	Yes	None	Yes	Yes*	\$5-10K
Raised Intersection	Yes	Maybe	Increase	Maybe	None	Yes	Yes	\$25-50K
Traffic Circles	Yes	Maybe	No Change	Yes	Yes	Yes	Yes	\$15-25K
Intersection Channelizing	Yes	Maybe	No Change	Yes	None	None	Maybe	\$15-20K
Chicane	Yes	Maybe	No Change	Yes	Maybe	Some	Maybe	\$20-40K
Movement Barrier	Maybe	Yes	Decrease	None	Yes	Yes	Yes	\$5K
Entrance Barriers	Maybe	Yes	No Change	Maybe	Yes	Maybe	Yes	\$15-20K
Diagonal Diverter	Maybe	Yes	No Change	Maybe	Yes	Yes	Yes	\$15-35K
Street Closure	Maybe	Yes	No Change	Maybe	Yes	Yes	Yes	\$20-35K

*Speed humps and raised crosswalks must be reinstalled each time a street is resurfaced.

Sources: "Neighborhood Traffic Management & Calming Program," City of Buena Ventura, CA 1997 and Parisi Associates.

Level 1 & 2 Traffic Calming Tools

Level 1 measures consist of easily implementable and low-cost tools, such as traffic safety campaigns, radar speed display units, targeted police enforcement, sign installation, and pavement marking changes. Level 1 measures, as discussed in Chapter 2, will always be implemented and tested prior to consideration of more restrictive measures. Level 1 action primarily consists of education and enforcement tools. Before Level 2 traffic calming actions are implemented, the neighborhood and City staff must carefully evaluate the benefits and disadvantages of each action.

Combining Traffic Calming Measures

Often, the most effective traffic calming programs use a variety of traffic calming tools. Combinations of traffic calming measures can be used, and are often encouraged, in different neighborhoods and even along the same street. As shown in the toolbox of Level 1 and Level 2



applications, many of the measures complement each other. For instance, speed humps and chokers can be used effectively together, as can traffic circles and curb extensions. Center median islands and chokers are often installed together. Raised crosswalks and curb extensions also work well together. Many other combinations of traffic calming tools can be effective.

Gallery of Tools

Whenever feasible, the City of Palm Springs will install temporary Level 2 traffic calming devices subject to an assessment of impacts and support of the residents. It should be noted that while the use of temporary devices can help determine the resulting travel speed and traffic volume changes, temporary devices are usually not aesthetic. Because of this, there is always the risk that residents will criticize the device's appearance instead of its effectiveness in traffic calming. However, the use of attractive materials, colors and composition can create acceptable temporary devices. For example, planters, which can provide landscaping opportunities, as well as access control, can be used as temporary street closures.

The following pages provide a gallery of potential Level 1 and Level 2 traffic calming measures. It is often possible to combine elements of various Level 2 actions or to slightly modify treatments.



LEVEL 1 MEASURES



Neighborhood Traffic Education Campaign

Level 1

Description: Neighborhood traffic safety campaigns include personalized letters, neighborhood flyers, meetings, workshops, specific school programs, and neighborhood speed awareness signs or banners.

Application: The intended benefit of conducting neighborhood traffic safety campaigns is usually to increase awareness of local speed limits and other traffic and safety concerns.

Advantages:

- + Allows residents to discuss views.
- + Identifies issues of concern.
- + Enables staff to see concerns.
- + Reduces speeds temporarily.

Disadvantages:

- Effectiveness may be limited.
- Meetings need to stay focused.
- Potentially time consuming.
- Enforcement still likely required.

Special Considerations:

- Neighborhood traffic safety campaigns can consist of letters and/or flyers.
- Often, neighborhood meetings or workshops are conducted.
- Any meetings or workshops need to stay focused on specific traffic issues.
- Neighborhood speed awareness signs or banners are sometimes used.
- Usually only effective over a short duration.



Speed Display Unit

Level 1

Description: The most common form of radar speed display unit is a portable trailer equipped with a radar unit that detects the speed of passing vehicles and displays it on a reader board, often with a speed limit sign next to the display.

Application: The primary benefit of a speed display unit is to discourage speeding along neighborhood streets.

Advantages:

- + Effective education tool.
- + Good public relations tool.
- + Encourages speed compliance.
- + Can reduce speeds temporarily.

Disadvantages:

- Not an enforcement tool.
- Ineffective on multi-lane roadways.
- Less effective on high volume streets.
- Subject to vandalism.

Special Considerations:

- Used throughout the city on an ongoing basis.
- The purpose of the unit is to remind drivers that they are speeding.
- Encourage compliance with the posted speed limit.
- Usually only effective in reducing speeds when actually being used.
- In longer term (30 days), speeds can decrease by 6% on low volume roads.
- Effect usually negligible on higher volume streets serving through traffic.
- Some motorists may speed up to try to register a high speed.
- Should not be used in remote areas due to possible vandalism.



Higher Visibility Crosswalks

Level 1

Description: Higher visibility cross walks can be created by using paving blocks or contrasting color concrete, or painting zebra stripes in lieu of or between the crosswalk's outer boundary stripes and using flashing beacon warning signs or flashing pavement beacons.

Application: The primary benefit of a higher visibility crosswalk is to increase crosswalk visibility to drivers.

Advantages:

- + More visible than traditional x-walks.
- + Indicates preferred crossing location.
- + Can slow travel speeds.
- + Can be aesthetically pleasing

Disadvantages:

- Pedestrians may ignore traffic more.
- Only used at uncontrolled crosswalks.
- Usually require more maintenance than traditional crosswalks.

Special Considerations:

- Higher visibility crosswalks indicate preferred crossing location to pedestrians.
- Pedestrians may place too high a reliance on ability to control driver behavior.
- Specially paved types require more maintenance than traditional crosswalks.
- Should only be used at uncontrolled crosswalks.
- Less expensive, but not as effective as raised crosswalks (Level 2).



Targeted Police Enforcement

Level 1

Description: The Police Department deploys motorcycle or automobile officers to perform targeted enforcement on residential streets for at least an hour a day.

Application: The intended benefit of targeted police enforcement is to make drivers aware of local speed limits and to reduce speeds.

Advantages:

- +Visible enforcement is effective.
- +Driver awareness increased.
- +Can be used on short notice.
- +Can reduce speeds temporarily.

Disadvantages:

- Temporary measure.
- Requires long-term use to be effective.
- Fines are lower than enforcement cost.
- Disrupts traffic on high volume streets.

Special Considerations:

- Police enforcement is continually in effect throughout the city.
- Usually used only on neighborhood streets with documented speeding problems.
- Typically, only effective while officer is actually monitoring speeds.
- Often helpful in school zones.
- May be used during a learning period when new devices are first implemented.
- Long-term benefits unsubstantiated without regular periodic enforcement.
- Expensive.



Narrowing Lanes

Level 1

Description: On this level 1 type of measure, striping is usually used to create narrow lanes, often about 10 feet wide. The unused pavement can be used to stripe bicycle and/or parking lanes.

Application: The primary benefit of narrowing lanes through striping is to slow vehicle speeds.

Advantages:

- + Can be quickly implemented.
- + Slows travel speeds.
- + Improves safety.
- + Can be easily modified.

Disadvantage:

- Increases regular maintenance.
- Not always perceived as effective tool.
- Adds striping to neighborhood streets.
- Increases resurfacing costs.

Special Consideration:

- Narrowed travel lanes provided "friction" and can slow vehicle speeds.
- Can be installed quickly and easily revised over time.
- Designated bicycle lanes and/or parking lanes can be created.
- Adds centerline and edge line striping to neighborhood streets.
- Can be used around curves to force vehicles to stay within lanes.
- On curves, raised dots are usually most effective on centerline.



Speed Limit Signing

Level 1

Description: 25 mile per hour speed limit signs are installed along neighborhood streets.

Application: The primary benefit of speed limit signing is to encourage slower vehicle speeds along residential streets. Signs are only installed along streets where speeding is a problem.

Advantages:

- + Clearly defines legal speed limit
- + Can reduce speeds if enforced
- + Usually popular with neighborhood
- + Low-cost installation.

Disadvantages:

- Requires on-going police enforcement
- Adds additional signs in neighborhood

Special Considerations:

- Should only be used on streets where speeding is a documented problem.
- Requires police enforcement to remain effective.
- Speed limits lower than 25 mph can only be set by engineering analysis.
- Unrealistically low speed limits will likely result in signs being disregarded.
- Increased cost of sign maintenance



Stop Signs

Level 1

Description: Stop signs are either installed on the side street where no signs currently exist or on the main street at an intersection where the side street already has stop signs.

Application: Stop signs should only be considered when warranted based on established criteria.

Advantages:

- + Requires traffic to stop.
- + Assists pedestrian crossings.
- + May slightly reduce cut-thru traffic
- + Low cost

Disadvantages:

- May lead to increased mid-block speeds.
- Increases vehicle acceleration noise
- Stop compliance may decrease if unwarranted.
- May increase emergency response time

Special Considerations:

- Stop signs should only be installed if warranted based on established criteria.
- Drivers may not comply with stop signs if installation is unwarranted.
- Mid-block speeds can increase to make up for "lost" time.
- At low volume, unwarranted locations, many drivers will "roll" through.
- Can create safety problems for pedestrians when compliance is poor.
- Stop signs may increase certain types of collisions, e.g., rear-ends
- Stop signs may reduce other types of collisions, i.e., broadside collisions.
- May increase emergency response times.
- Increases noise near intersection due to vehicle deceleration and acceleration.



Restricted Movement Signing

Level 1

Description: Turn prohibition signs involve the use of standard No Left Turn, No Right Turn, or Do Not Enter signs to prevent undesired turning movements onto residential streets. They may include peak period limitations.

Application: The primary benefit of restricted movement signing is to reduce cut-through traffic volumes along residential streets.

Advantages:

- + Redirects traffic to main streets
- + Reduces cut-through traffic.
- + Can address time-of-day problems
- + Low cost

Disadvantages:

- May divert traffic to other streets
- Require enforcement
- Adds more signs to neighborhood.
- Usually not effective all day.

Special Considerations:

- Restricted movement signing is best used on major or collector streets.
- Most effective at periphery of a neighborhood to prevent entering traffic.
- Has little or no effect on speeds for through vehicles.
- Turn prohibitions can be used on a trial basis.
- Violation rates are about 50% without enforcement.
- With active enforcement, violation rates are reduced to about 20%.
- Turn restrictions are most effective when limited to peak hours.
- Less effective when applied around-the-clock.
- 24-hour restrictions better served with closures than with signing.



LEVEL 2 MEASURES



Median Island

Level 2

Description: Median islands are raised islands in the center of a street that can be used to narrow lanes for speed control and/or to create a barrier to prohibit left-turns into or from a side street. They can also be used for pedestrian refuge in the middle of a crosswalk.

Application: Median islands are used on wide streets to lower travel speeds and/or to prohibit left-turning movements.

Advantages:

- + Effectively reduces vehicle speeds.
- + Can reduce collision potential.
- + Reduces pedestrian crossing.
- + Opportunity for landscaping.
- + May divert unwanted traffic volumes.

Disadvantages:

- Could require parking removal.
- May reduce driveway access.
- Could impact emergency vehicles.
- May create more difficult access.
- Requires additional maintenance.

Special Considerations:

- Median islands, when used to block side street access, may divert traffic.
- In this condition, they may impact emergency response times.
- Median islands may visually enhance the street through landscaping.
- Median islands used for lane narrowing should result in a least 12' lanes.
- Fire departments usually prefer median islands to some other measures.
- Bicyclists prefer not to have travel way narrowed.



Gateway

Level 2

Description: Gateway entrance treatments consist of physical treatments like pillars and other vertical treatment as well as texture treatments to the street surface and are located at key entryways into a neighborhood. They often consist of features, like chokers, that narrow a street in order to reduce the width of the street's traveled way.

Application: The primary benefit of gateway treatments is speed reduction. They provide visual cues that tell drivers they are entering a local residential area or, that the surrounding land uses are changing.

Advantages:

- + Can reduce vehicle speeds.
- + Creates identity for neighborhood.
- + Can discourage cut-through traffic
- + Opportunity for landscaping

Disadvantages:

- Maintenance and irrigation needs
- May require removal of parking
- Can impede truck movements
- Creates physical obstruction

Special Considerations:

- Gateways have minimal influence on driver's routine behavior.
- Overall speeds and volumes may only minimally be influenced.
- Gateway treatments make drivers more aware of neighborhood environment.
- Can incorporate neighborhood identification signing and monumentation.
- Care should be taken not to restrict pedestrian visibility at adjacent crosswalk.
- Textured pavements could introduce some new noise.



Curb Extension

Level 2

Description: Curb extensions narrow the street at the intersection by extending the curbs toward the center of the roadway or by building detached raised islands to allow for drainage and bike lane access.

Application: Curb extensions are used to narrow the roadway and to create shorter pedestrian crossings. They also improve sight distance and influence driver behavior by changing the appearance of the street.

Advantages:

- + Better pedestrian visibility.
- + Shorter pedestrian crossing.
- + Can decrease vehicle speeds.
- + Opportunity for landscaping.

Disadvantages:

- Can require removal of parking.
- May create hazard for bicyclists.
- Can create drainage issues.
- Difficult for truck traffic to turn right.

Special Considerations:

- Curb extensions can be installed at intersections or mid-block (see chokers).
- Mid-Block chokers are often used with pedestrian crossing treatments.
- Curb extensions should not extend into bicycle lanes, where present.
- Curb extensions at transit stops enhance service.
- No noise and little emergency service impacts.
- May require landscape maintenance to preserve sight distances.



Choker

Level 2

Description: Chokers are mid-block curb extensions that narrow a street by extending the sidewalk or widening the planting strip. The remaining cross-section can consist of one lane (for one way streets) or two narrow lanes.

Application: Chokers are intended to reduce traffic volumes and speeds by narrowing the roadway and making it uncomfortable to drive above the desired speed.

Advantages:

- + Effectively reduces vehicle speeds.
- + Shorter pedestrian crossing.
- + Provides improved sight distance.
- + Opportunity for landscaping.

Disadvantages:

- Can require removal of parking.
- May create hazard for bicyclists.
- Can create drainage issues.
- May impede truck movements.

Special Consideration:

- Chokers can be designed with protected bike lane next to original curb.
- Chokers with exclusive bike lanes can collect debris in bike lane.
- Can impact driveway access.
- Also reduce travel speeds when cross-section reduced substantially.
- Preferred by many emergency response agencies to other measures.
- Provide excellent opportunities for landscaping.



Speed Hump

Level 2

Description: Speed humps are asphalt mounds constructed on residential streets. They are usually placed in a series and spaced 300 to 600 feet apart. Speed humps are typically 12'-20' feet long and no more than 3 inches high. The vertical deflection of the hump is designed to encourage motorists to reduce their speed.

Application: The primary benefit of speed humps is speed reduction. They work well in conjunction with curb extensions.

Advantages:

- + Effectively reduces vehicle speeds.
- + Does not require parking removal.
- + Can reduce vehicular volumes.
- + Easily tested on temporary basis.

Disadvantages:

- Slows emergency vehicles.
- Increases noise near speed humps.
- May divert traffic to parallel streets.
- Not aesthetically pleasing.
- Difficult to construct without the proper tools.

Special Considerations:

- Vehicle speeds between humps have been shown to decrease by up to 25%.
- Volumes may decrease if parallel route, without measures, is available.
- Possible increase in traffic noise from braking and accelerating.
- Highest noise increase from buses and trucks.
- Speed humps reduce emergency vehicle response times.
- 3-5 second delay per hump for fire trucks, 10 seconds for ambulances.
- Speed humps require advance-warning signs and object markers at hump.
- Difficult to construct precisely, unless pre-fabricated.



Level 2 - Speed Cushions

Description: A speed cushion is typically a rectangular section of pavement that is raised no more than 3 inches high. Speed cushions are placed across the travel way with a 3-foot space between each cushion sets. The 3-foot space allows for Fire Trucks to traverse without having to actually run over the speed cushions. This reduces noise created by large vehicles. Speed cushion sites are generally placed 300-600 feet along the roadway. Their vertical deflection encourages passenger vehicles to reduce speed.

Application: The primary benefit of speed cushions is speed reduction without excessive noise generally created by commercial vehicles.

Advantages:

- + Effectively reduces vehicle speeds
- + Does not require parking removal
- + Can reduce vehicular volumes.
- + Easily tested on temporary basis

Disadvantages:

- Slows emergency vehicles
- Increases noise near speed cushions
- May divert traffic to parallel streets
- May not be aesthetically pleasing

Special Considerations:

- Vehicle speeds between locations have been shown to decrease by up to 25%.
- Volumes may decrease if parallel route is available.
- May generate noise, especially as trucks with trailers pass over speed cushions.
- Speed cushions reduce emergency vehicle response times.
- Speed cushions require advance-warning signs and object markers at cushion location.



Raised Crosswalk

Level 2

Description: Raised crosswalks are crosswalks constructed 3 to 4 inches above the elevation of the street. They are usually about 22 feet long, with a flat section in the middle and ramps on the ends. Sometimes the flat portion is constructed with brick or other textured materials.

Application: Raised crosswalks are intended to reduce vehicle speeds specifically where a high amount of pedestrians cross the street.

Advantages:

- + Effectively reduces vehicle speeds.
- + Good pedestrian safety treatment.
- + Does not affect access.
- + Flat portion can be textured.

Disadvantages:

- May generate increased noise.
- Can require drainage modifications.
- Three (3) seconds delay for emergency vehicles.
- New crosswalk location may require parking removal.

Special Considerations:

- Raised crosswalks are usually 22 feet long, with a 10-foot wide flat section.
- Lower elevation than sidewalk to alert visually impaired of a crosswalk.
- Careful design is needed due to potential drainage issues.
- Usually preferred by Fire Departments over standard speed hump.
- Work well in combination with curb extensions and curb radius reductions.
- Does not affect access
- Increases pedestrian visibility and likelihood that driver yields to pedestrian.
- Often referred to as speed tables or speed platforms.



Raised Intersection

Level 2

Description: A raised intersection is a flat, raised area covering an entire intersection. There are ramps on all approaches. The plateau is usually about 4" high. Usually, the raised intersection is finished in brick or other textured materials.

Application: Raised intersections are used to reduce through movement speeds and provide safer street crossings for pedestrians.

Advantages:

- + Effectively reduces vehicle speeds
- + Good pedestrian safety treatment
- + Can be aesthetically pleasing
- + Does not affect access

Disadvantages:

- Expensive to construct and maintain
- Requires drainage modifications
- Affects emergency vehicle response
- May require bollards to define corners

Special Considerations:

- Raised intersections usually used in urban areas.
- Make entire intersections more pedestrian-friendly.
- Work well with curb extensions and textured crosswalks.
- Often part of an area wide traffic calming scheme involving both streets.
- Expensive.
- Special signing often required.



Traffic Circle

Level 2

Description: Traffic circles are raised circular islands in an intersection. They are typically landscaped with ground cover and/or street trees. Traffic circles require drivers to slow down to a speed that allows them to comfortably maneuver around the circle in a counterclockwise direction.

Application: The primary benefit of traffic circles is speed reduction and reduction of traffic collisions.

Advantages:

- + Effectively reduces vehicle speeds.
- + Reduces collision potential.
- + Provides better side-street access.
- + Opportunity for landscaping.

Disadvantages:

- Parking removal required.
- Can increase bike/auto conflicts.
- Can impede emergency vehicles.
- Can restrict large vehicle access.

Special Considerations:

- Traffic circles are best used in a series or with other devices.
- About 30 feet of curbside parking must be prohibited in advance of circle.
- Buses can maneuver around traffic circles at slow speeds.
- Noise impacts are minimal.
- If well maintained, traffic circles can be attractive.
- Many traffic signs and pavement markings are required.
- Traffic circles are less effective at T-intersections and offset intersections.



Intersection Channelization

Level 2

Description: Providing channelization at three-legged intersections forces previous straight-through movements to make slower turning maneuvers. Channelization is usually raised.

Application: The primary benefit of realigning intersections is speed reduction. Can also be used to redirect traffic to another facility or to provide neighborhood gateway.

Advantages:

- + Effectively reduces vehicle speeds.
- + Low impact to emergency services.
- + Can discourage through traffic.
- + Opportunity for landscaping.

Disadvantages:

- Parking removal required
- May direct traffic to other street(s).
- Increased maintenance responsibility.
- High cost to construct.

Special Considerations:

- Intersection channelization slows traffic down near the intersection.
- Improvement may also discourage some cut-through traffic.
- No significant impedance to fire and transit service.
- Provides landscaping opportunities and potential gateway treatments.
- Can require drainage modifications.
- Possible to vary traffic control with stop signs on one or all three legs.



Chicane

Level 2

Description: A chicane is a series of two or more staggered curb extensions on alternating sides of a roadway. Horizontal deflection influences motorists to reduce speed through the serpentine roadway.

Application: The primary benefit of a chicane is speed reduction without a significant impact to emergency vehicle mobility.

Advantages:

- + Effectively reduces vehicle speeds.
- + Low impact on emergency vehicles
- + Opportunity for landscaping.

Disadvantages:

- Significant parking loss.
- Increased maintenance.
- May require right-of-way.
- High cost to install.
- May restrict resident access.

Special Consideration:

- A chicane cannot usually be used where right-of-way is limited.
- May require removal of substantial amounts of on-street parking.
- Most effective with equivalent traffic volumes along both approaches.
- May increase conflicts with pedestrians and bicyclists.
- A chicane provides landscaping opportunities.
- Design must consider driveway locations.
- No expected noise impacts.



Restricted Movement Barrier

Level 2

Description: Restricted movement barriers are raised islands that prevent certain movements at an intersection. They are often landscaped.

Application: The primary benefit of restricted movement barriers is to reduce cut-through traffic levels. They also provide pedestrian refuge areas for street crossings.

Advantages:

- + Redirects traffic to other streets.
- + Reduces cut-through traffic.
- + Provides pedestrian refuge area.
- + Opportunity for landscaping.

Disadvantages:

- Redirects traffic to other streets.
- Will increase trip lengths.
- May impact emergency response.
- Creates physical obstruction.

Special Considerations:

- Barriers have a little or no affect on speeds for through vehicles.
- Should not be used on critical emergency response routes.
- Reduces number of potential conflict points for turning vehicles.
- Possibility for landscaping.
- Many variations are possible, including prohibiting turns to/from main street.
- Design needs to consider drainage needs.
- Usually require signing



Entrance Barrier

Level 2

Description: Entrance barriers are curb extensions or barriers that restrict movements into a street. They are constructed to approximately the center of the street, effectively obstructing one direction of traffic. Entrance barriers create a one-way segment at the intersection, while maintaining two-way traffic for the rest of the block.

Application: The primary benefit of entrance barriers is traffic volume reduction.

Advantages:

- + Reduces cut-through traffic.
- + More self-enforcing than signs.
- + Shorter pedestrian crossings.
- + Opportunity for landscaping.

Disadvantages:

- May divert traffic to other streets.
- Can increase trip lengths.
- Potential parking removal.
- Increased maintenance responsibility.

Special Considerations:

- Restrict movements into street while allowing resident access within block.
- Potential use must consider how residents will gain access.
- In emergency situations, emergency vehicles can gain access.
- But, required maneuver may increase emergency response times.
- Can be provided on opposite intersection corners.
- Bicycles are typically permitted to travel through in both directions.
- Entrance barriers can be nicely landscaped.
- In effect at all times, even when cut-through volumes may be low.

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Diagonal Diverter

Level 2

Description: Diagonal diverters are raised areas placed diagonally across a four-legged intersection. They prohibit through movements by creating two “L” shaped intersections.

Application: The primary benefit of diagonal diverters is reduction in traffic volumes. These type of diverters also minimally decrease speeds near the intersection.

Advantages:

- + Reduces cut-through traffic.
- + Self-enforcing.
- + Reduces collision potential.
- + Opportunity for landscaping.

Disadvantages:

- Redirects traffic to other streets.
- May increase trip lengths.
- Can impede emergency vehicles.
- Always in effect.

Special Considerations:

- Diagonal diverters can be designed to allow emergency vehicle access.
- Can be designed to allow pedestrian and bicycle access.
- They may shift problems elsewhere unless strategic program developed.
- Provide advantage over complete street closure as circulation is less impacted.
- Can be attractively landscaped.
- Has little or no effect on mid-block speeds.
- Traffic circles are less effective at T-intersections and offset intersections.



Street Closure

Level 2

Description: Full street closures are barriers placed across a street to completely close the street to through-traffic, usually leaving only sidewalks open. They are sometimes called cul-de-sacs or dead-end streets.

Application: Street closures are intended to change traffic patterns. They are very effective at reducing cut-through and general traffic volumes.

Advantages:

- + Reduces cut-through traffic.
- + May reduce local traffic speeds.
- + Self-enforcing.
- + Opportunity for landscaping.

Disadvantages:

- Directs traffic to other streets.
- Increases trip lengths.
- Affects emergency response time.
- May lose some on-street parking.

Special Considerations:

- Street closures typically only used after other measures have failed.
- Often used in sets to make travel circuitous, typically staggered.
- Require strategic pattern of devices to not shift problem elsewhere.
- Can be placed at an intersection or mid-block.
- Not used on major emergency response routes or transit routes.
- May be designed to allow emergency vehicle access.
- Usually designed with small opening to allow bicyclists and pedestrians.
- Often consist of landscaping.



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