

## Purpose

Conversion of two-way streets to one-way operation for purposes of residential street traffic control take three forms:

CASE #1 - Divergent and convergent one-way residential streets to reduce direct through routes impacting the neighborhood.

CASE #2 - Alternating one-way streets throughout a portion of a grid system to gain safety advantages of one-way operations.

CASE #3 - Creating a one-way couplet by paring a residential street with a nearby thru street to create a corridor for thru traffic



R6-1



R6-2

Source: FHWA Manual on Uniform Traffic Control Devices

<b>Effects</b>	
<i>Volumes</i>	Case #1 – reduces traffic volumes where thru traffic is a problem Case #2 – no significant effect on traffic volumes Case #3 – increases volumes on one street and reduces volumes on adjacent streets
<i>Speed</i>	May increase speeds due to improved motorist comfort levels.
<i>Traffic Noise and Air</i>	Minimal effect except in Case #1 which creates longer, circuitous routes for local traffic.
<i>Traffic Safety</i>	One-way streets result in fewer potential conflicting movements, improving safety.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Possible increased parking</li> <li>• Inexpensive to implement</li> <li>• May reduce traffic volumes</li> <li>• May increase roadway capacity</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• May be considered inconvenient for residents</li> <li>• Possible increase in speeds</li> <li>• May increase volumes on other streets</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• High traffic volumes</li> <li>• High crashes due to conflicting movements</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• One way streets can be used in combinations that force turns every few blocks to minimize speeding or cut-through problems</li> </ul>

## Purpose

Regulatory sign that is used to assign right-of way at an intersection. Only recommended for installation if specific guidelines are met in accordance with the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD). Stop signs should not be used for speed control or volume reduction and should not be installed on the major street unless justified by an engineering report.



R1-1

Source: FHWA Manual on Uniform Traffic Control Devices

<b>Effects</b>	
<i>Volumes</i>	Little or no effect.
<i>Speed</i>	Little or no reduction in speed, speed possibly increases due to drivers speeding up to make up for time lost at the stop sign.
<i>Traffic Noise and Air</i>	Noise is increased near the intersection due to the increase activity of acceleration. Air quality worsens due to deceleration, idling and acceleration.
<i>Traffic Safety</i>	Possible increase in crashes, possibly due to the stop signs being unexpected or deemed unnecessary, therefore encouraging rolling stops or by instilling a false sense of security in crossing motorists and pedestrians.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Inexpensive installation costs (do require continual maintenance costs).</li> <li>• Defines driver's right-of-way.</li> <li>• Increase opportunity for pedestrians to cross the roadway.</li> <li>• May discourage cut-through traffic.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Can cause negative traffic safety impacts if sign is not warranted.</li> <li>• May result in mid-block speeding</li> <li>• Increasing levels of intersection control are associated with increased frequency of crashes.</li> <li>• Difficult to enforce full stop control compliance.</li> <li>• Could result in increase in speeds between the signs as drivers try to make up for lost time.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• At intersections where right-of-way is confusing.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Guidelines need to be met as established in the Minnesota Manual on Uniform Traffic Control Devices.</li> <li>• In most cases the street carrying the lowest volumes should be stopped to minimize the number of vehicles stopping.</li> </ul>

## All-Way Stop Sign Implementation

### Purpose

The All-Way STOP condition is primarily intended to address either a higher than expected intersection crash frequency or to be an interim measure at locations that have demonstrated a need for a traffic signal installation, but where the signal cannot be installed in a reasonable period of time. It is a common belief that installing STOP signs on all approaches of an intersection will result in fewer crashes. Research indicates that average crash frequency at All-Way STOP controlled intersection is 50% higher than thru/STOP intersections. Also, there is no evidence to suggest that STOP signs decrease travel speeds.



R1-1

Source: FHWA Manual on Uniform Traffic Control Devices

<b>Effects</b>	<p><i>Volumes</i> Little or no effect.</p> <p><i>Speed</i> Little or no reduction in speed, mid-block speed possibly increase.</p> <p><i>Traffic Noise and Air</i> Little or no effect.</p> <p><i>Traffic Safety</i> In most cases, the installation of an All-Way STOP will increase the frequency of crashes. Only in those rare cases where the number of crashes with the thru/ STOP control is unusually high, is the forecast of safety improvement probable.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Inexpensive installation costs (do require continual maintenance costs).</li> <li>• Defines driver's right-of-way.</li> <li>• Increase opportunity for pedestrians to cross the roadway.</li> <li>• May discourage cut-through traffic.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Can cause negative traffic safety impacts if sign is not warranted.</li> <li>• May result in mid-block speeding.</li> <li>• Increasing levels of intersection control are associated with increased frequency of crashes.</li> <li>• Difficult to enforce full stop control compliance.</li> <li>• Could result in increase in speeds between the signs as drivers try to make up for lost time.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Unusual conditions at intersection including crash frequency, turning patterns, delay and pedestrian conflicts.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Traffic volumes and crash frequency thresholds need to be met as established in the Minnesota Manual on Uniform Traffic Control Devices.</li> <li>• The most effective deployment of the All-Way STOP condition is at intersections where the volume of traffic on the major and minor roads is approximately equal.</li> </ul>

## Parking Restrictions

### Purpose

Parking restrictions can assist in improving residential street safety in two ways:

- 1) Clearance No Parking Zones to improve sight lines at intersections and crosswalks
- 2) Extended No Parking Zones to improve visibility of and for pedestrians along the length of the block.



Source: FHWA Manual on Uniform Traffic Control Devices

<b>Effects</b>	
<i>Volumes</i>	Little or no effect.
<i>Speed</i>	Minimal changes unless there are extended No Parking Zones that can create the potential for increased speeds.
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	Increasing sight line distances reduce right angle conflict between vehicles at intersections, alleys and driveways.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Can reduce some types of accidents (late evening hit and run parked vehicle accidents and crashes related to parking maneuvers).</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• In area where on-street parking is at capacity and there is no alternative off street parking additional restriction to parking can be controversial to residents.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Non-Residential parking intrusion.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Should review the impacts of parking on surrounding streets.</li> </ul>

**Purpose**

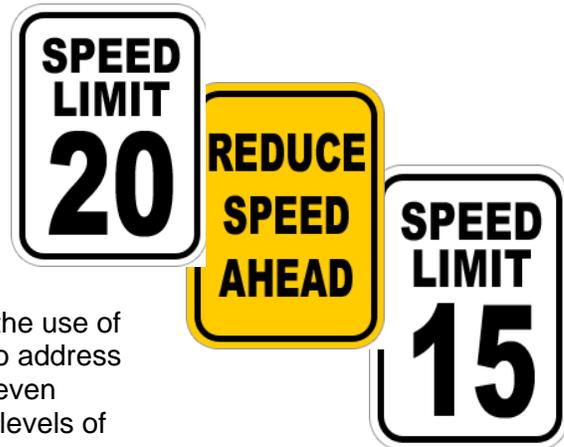
Provide a designated, marked location for pedestrians to cross residential street and make drivers more aware of potential pedestrian conflicts.



<b>Effects</b>	<p><i>Volumes</i> No effect</p> <p><i>Speed</i> No effect</p> <p><i>Traffic Noise and Air</i> No effect</p> <p><i>Traffic Safety</i> Research has shown that marked crosswalks at uncontrolled intersection are unrelated to pedestrian safety.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Reasonably effective at identifying locations with potential pedestrian conflicts.</li> <li>• Helps to concentrate pedestrian activities at specific intersection and on specific legs of intersections.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• At uncontrolled intersections, appears to create a false sense of security in pedestrians – the 8” white line will stop the oncoming 4,000 pound vehicle.</li> <li>• Costly to maintain.</li> <li>• Not required to establish legal cross-walk locations.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Concentrating pedestrian crossing activities, particularly when combined with other strategies such as advanced warning signs, systems of sidewalks, enforcement, etc.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Marking cross walks is not necessary to establish legal crossing locations and is unrelated to pedestrian safety.</li> <li>• Marked crosswalks may be part of a program to designate walking routes and concentrate pedestrian crossings when combined with other strategies.</li> </ul>

**Purpose**

Speed limits are determined by the Minnesota Department of Transportation (consistent with State Statutes) based on an analysis of the actual speed profile of the road. The basic premise of Minnesota’s law is that the majority of motorists will pick a safe and reasonable speed given the horizontal and vertical design of the street, locations of driveways, sidewalks, obstructions, and the use of the street by pedestrians. Lowering the speed limit to address speeding in a neighborhood has never proven to be even moderately effective without also including very high levels of enforcement.



<b>Effects</b>	
<i>Volumes</i>	Little or no effect.
<i>Speed</i>	Drivers generally ignore posted speed limits and travel at speeds which the drivers consider reasonable.
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	Effects of speed limit changes on traffic safety on local residential streets have not been reported. Research suggests that crash frequencies on urban roadways are unrelated to vehicle speeds.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Research indicates that when speed limits are set at or near the 85<sup>th</sup> percentile speed, roadway crash frequencies are at a minimum.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Speed limits on urban roadways are either set by Statute or by MnDOT.</li> <li>• Research indicates that crash frequencies on urban roadways are unrelated to vehicle speeds.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• High speeds through residential neighborhood</li> </ul>
<b>Design</b>	

## Purpose

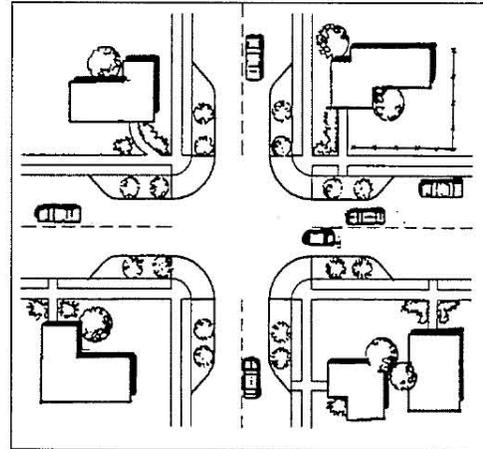
The reduction of the typical pavement width along a roadway. The narrowing can be achieved physically by removing part of the pavement surface or by simply using pavement markings to indicate narrow travel lanes.

<b>Effects</b>	<p><i>Volumes</i> Little or no effect.</p> <p><i>Speed</i> Possible reduction in speed.</p> <p><i>Traffic Noise and Air</i> Little or no effect.</p> <p><i>Traffic Safety</i> Potential for improved pedestrian safety due to shorter street crossing times, but at the same time bicycle safety may be compromised by physically removing part of the pavement surface.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Use of pavement markings to narrow street is relatively inexpensive (\$0.20 per lineal foot).</li> <li>• Narrowing of street may provide opportunity for street beautification programs.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• May require the prohibition of on-street parking causing hardship or inconvenience for residents.</li> <li>• May result in shifting volumes to adjacent streets if number of lanes is reduced</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Wide residential streets where speed reduction is desired.</li> <li>• Excess street volume on multilane streets.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Must not create significant impact due to loss of parking.</li> </ul>

## Intersection Chokers

### Purpose

Narrowing of the street at an intersection to constrain the width of the traveled way. They provide shorter pedestrian crossing distances and provide protection to the beginning of a parking lane. The driver also senses the roadway narrowing when approaching one of these measures, which can result in speed reduction and a reminder that the driver is entering a residential area.



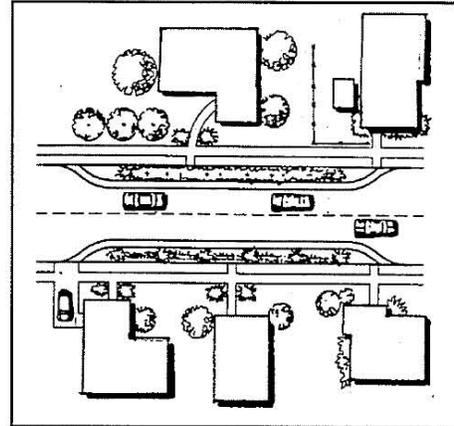
Source: Institute of Transportation Engineers  
*Traffic Calming: State of Practice*

<b>Effects</b>	<p><i>Volumes</i> Little or no effect.</p> <p><i>Speed</i> Minimal changes.</p> <p><i>Traffic Noise and Air</i> Little or no effect.</p> <p><i>Traffic Safety</i> Potential for improved pedestrian safety due to shorter street crossing times, but at the same time bicycle safety may be compromised by physically removing part of the pavement surface.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Good for pedestrians due to shorter crossing distance</li> <li>• Provides space for landscaping and neighborhood “gateway”.</li> <li>• Should not affect emergency response time.</li> <li>• Minimal inconvenience to drivers.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• May require the prohibition of on-street parking causing hardship or inconvenience for residents.</li> <li>• May cause bicyclists to travel in same traffic lane as vehicles.</li> <li>• May require redesign of drainage system.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Mid- block locations with speeding and/or cut-through traffic</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• There must be adequate turning radius for emergency vehicle access especially on narrow streets.</li> <li>• Drainage structures must be relocated to fit into new curb line.</li> </ul>

## Mid-Block Narrowing

### Purpose

Segment(s) of roadway narrowing where curbs are extended toward the center of the roadway on one or both sides of the street to constrain the width of the traveled way. They provide shorter pedestrian crossing distances and provide protection to the beginning of a parking lane. The driver also senses the roadway narrowing when approaching one of these measures, which can result in speed reduction.



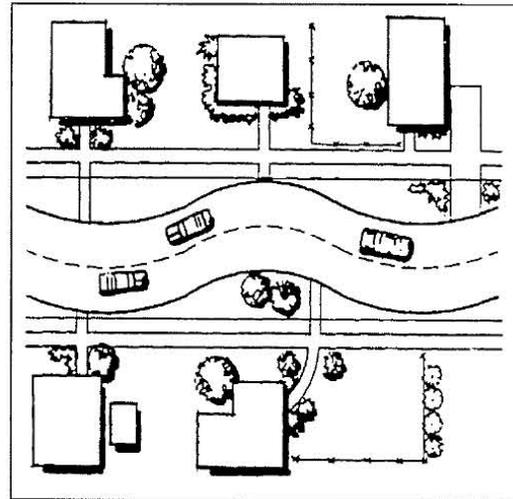
Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	
<i>Volumes</i>	Little or no effect.
<i>Speed</i>	Minimal changes.
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	Potential for improved pedestrian safety due to shorter street crossing times, but at the same time bicycle safety may be compromised by physically removing part of the pavement surface.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Good for pedestrians due to shorter crossing distance.</li> <li>• Provides space for landscaping.</li> <li>• Does not affect emergency response time.</li> <li>• Minimal inconvenience to drivers.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• May require the prohibition of on-street parking causing hardship or inconvenience for residents.</li> <li>• May create drainage issues where curb and gutter exist.</li> <li>• May create diversion for bicyclists.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Mid- block locations with speeding and/or cut-through traffic.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Must not significantly impede emergency vehicle access.</li> <li>• Drainage structures must be relocated to fit into new curb line.</li> </ul>

**Purpose**

Curvilinear reconstruction involving the introduction of curvatures on previously straight alignment. Curvilinear reconstruction can be accomplished in two different ways:

1. Reconstruct the street with a curved centerline alignment and a uniform roadway width.
2. Introduce chokers or other types of barriers on alternate sides of the street to create a serpentine travel path.



Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	<p><i>Volumes</i> Possible reduction in volumes.</p> <p><i>Speed</i> Possible reduction in speeds.</p> <p><i>Traffic Noise and Air</i> Little to no effect.</p> <p><i>Traffic Safety</i> Little or no effect.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Possible reduction in volumes and speed.</li> <li>• No restriction in access to residents.</li> <li>• Can be landscaped enhanced.</li> <li>• Less disruptive for emergency vehicles than speed humps.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Curbside parking must be prohibited in some locations.</li> <li>• Winter maintenance problems.</li> <li>• Possible impacts to drainage.</li> <li>• High cost of reconstruction.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Excessive speeds.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Not appropriate for narrow streets (24 feet is appropriate width).</li> <li>• Drainage structures must be relocated to fit into new curb line.</li> </ul>

**Purpose**

Sidewalks are intended to provide pedestrians with a safe walking location when traffic volumes or vehicle speeds make walking on the street potentially dangerous.

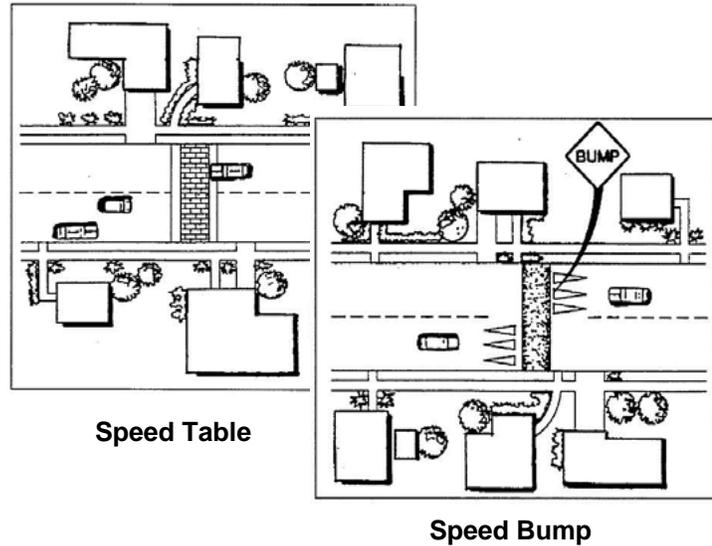


<b>Effects</b>	<p><i>Volumes</i> No Effect.</p> <p><i>Speed</i> No Effect.</p> <p><i>Traffic Noise and Air</i> No Effect.</p> <p><i>Traffic Safety</i> Possible decrease in pedestrian crashes.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Separates pedestrians and vehicles.</li> <li>• Very effective at reducing pedestrian/vehicle conflicts.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Moderately costly to implement.</li> <li>• Requires systematic deployment to achieve high levels of effectiveness.</li> <li>• Increased maintenance efforts.</li> <li>• Mixed neighborhood acceptance.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• High levels of pedestrian activity, especially at/near pedestrian generators (schools, parks, retail areas, etc).</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Should be installed along all arterials and collectors (because of the traffic volumes and speed) and along residential streets based on providing connections to areas with high levels of pedestrian activity.</li> </ul>

## Speed Humps/Tables

### Purpose

A physical feature (usually made of asphalt or rubber mounds) that are designed to rise above the roadway surface and extend across the roadway perpendicular to the traffic flow. Typically used to reduce vehicle speeds.



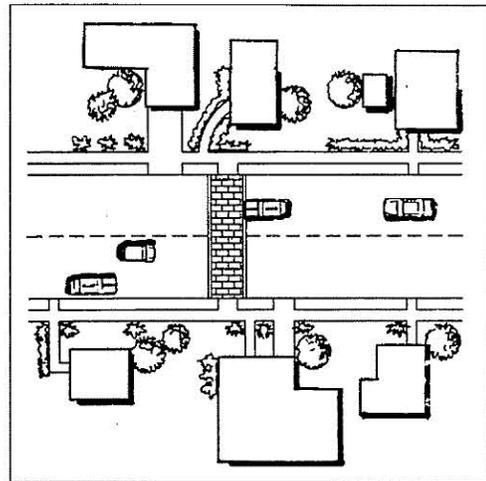
Source: Institute of Transportation Engineers  
*Traffic Calming: State of Practice*

<b>Effects</b>	<p><i>Volumes</i> May reduce traffic volumes.</p> <p><i>Speed</i> Effective in slowing vehicles traveling at typical residential speeds to approximately 5 to 15 mph depending on type installed at the device – may reduce overall speeds by 5 to 7 mph.</p> <p><i>Traffic Noise and Air</i> May have an increase of noise at the bumps/humps.</p> <p><i>Traffic Safety</i> Traffic safety has not been found to be compromised with these devices. Traffic safety benefits can be gained if speeding is involved.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Reduces speeds.</li> <li>• Usually reduces traffic volumes.</li> <li>• Does not require parking removal or interfere with bicycle/pedestrian traffic.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Can potentially increase noise.</li> <li>• Can cause traffic to shift to parallel residential or collector streets.</li> <li>• May decrease emergency vehicles response times.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Excessive speed.</li> <li>• High volumes.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Speed humps are only effective for 250 feet on either side of the hump. Thus, a neighborhood considering speed hump installation would require two to three installations.</li> </ul>

## Raised Crosswalk

### Purpose

A raised crosswalk is a speed table designed as a pedestrian crossing, usually at mid-block to provide additional warning of a pedestrian crossing

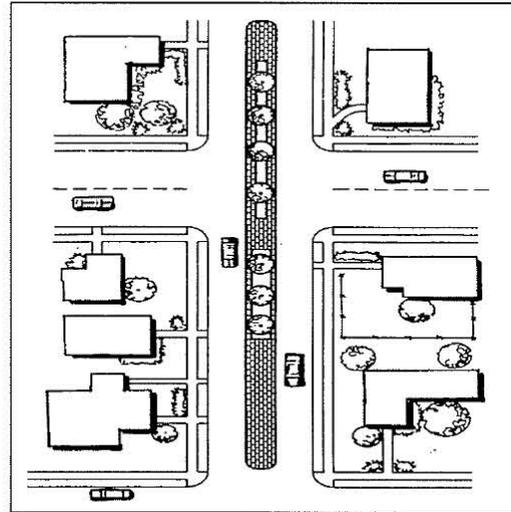


Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	<p><i>Volumes</i> Possible reduction in traffic volumes.</p> <p><i>Speed</i> Decrease in speed at crosswalk.</p> <p><i>Traffic Noise and Air</i> Possible increase in traffic noise.</p> <p><i>Traffic Safety</i> May increase awareness of pedestrians.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Speed control at pedestrian crossing.</li> <li>• Increases pedestrian visibility and awareness to driver.</li> <li>• May reduce traffic volumes.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Possible increase in noise.</li> <li>• Possible diversion of traffic to other streets.</li> <li>• May impact drainage.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• High mid-block pedestrian crossing and excessive vehicle speeds.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Should be placed in mid-block.</li> <li>• Not appropriate for grades greater than 5 percent.</li> <li>• Most common height is between 3 and 4 inches and typically have ramps 6 feet long.</li> </ul>

**Purpose**

A physical means for preventing left turning traffic on a major street from accessing a local street and through traffic from continuing on that local street. Alternate routes for diverted traffic should be analyzed with regard to traffic carrying capacity and desirability.

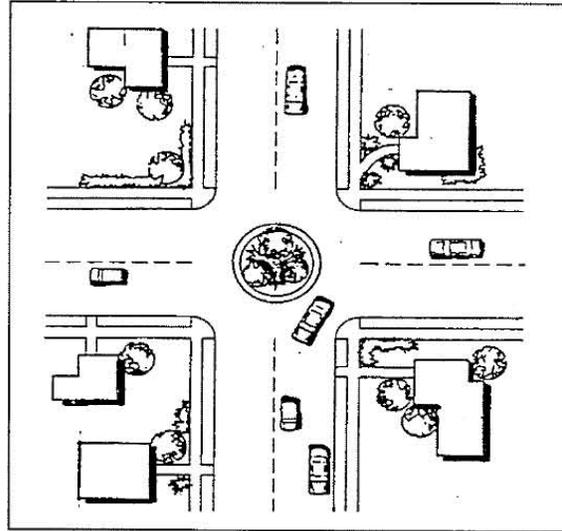


Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	<p><i>Volumes</i> Vary depending on proportion of traffic that is prohibited by the median barrier.</p> <p><i>Speed</i> Small reduction possible.</p> <p><i>Traffic Noise and Air</i> Little or no effect.</p> <p><i>Traffic Safety</i> May provide some safety benefits for pedestrians as a safety island for crossing the major street.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Assists in pedestrian crossing.</li> <li>• Prevents vehicles from passing vehicles that are turning right.</li> <li>• May improve safety through access limitations.</li> <li>• Visually enhances the street.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Diversion of traffic to other locations possible.</li> <li>• Disrupts continuity of local street system.</li> <li>• Landscaped islands require additional maintenance.</li> <li>• Reduction in access for residents.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Cut through traffic.</li> <li>• Vehicle conflicts.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Must meet drainage requirements.</li> <li>• Must not significantly impede emergency vehicle access.</li> </ul>

**Purpose**

A traffic circle is a raised geometric control island, frequently circular, in the center of an intersection of local streets. Typically, traffic circles would be about 20 feet in diameter. Traffic traveling through the intersection must avoid the island affecting the path and speed of the traffic.

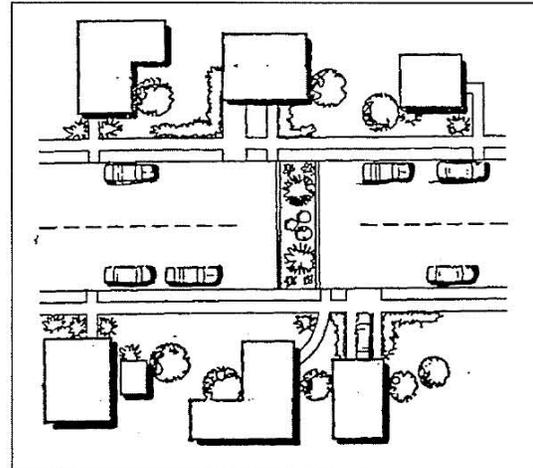


Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	<p><i>Volumes</i> Little or no effect.</p> <p><i>Speed</i> May reduce speed at intersection.</p> <p><i>Traffic Noise and Air</i> Little or no effect.</p> <p><i>Traffic Safety</i> May decrease vehicle conflicts at intersection.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Reduces speed at intersection approach.</li> <li>• Reduces vehicle conflicts at intersection.</li> <li>• Provides equal access to intersection for all drivers.</li> <li>• Does not restrict access to residents.</li> <li>• Can be landscaped.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Some parking restrictions required.</li> <li>• Local experience has found these devices to be ineffective.</li> <li>• Can restrict access for trucks, buses and may increase emergency vehicle response time.</li> <li>• Winter Maintenance.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Excessive speeds.</li> <li>• Crash history at intersection.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• A minimum of 30 feet of curbside parking must be prohibited at each corner of the intersection.</li> <li>• Unsuitable on MSA roads.</li> </ul>

**Purpose**

A street closure, for the purpose of this tool box, is defined as closing a street either at one end or the other, or at a mid block location to eliminate unwanted through traffic.



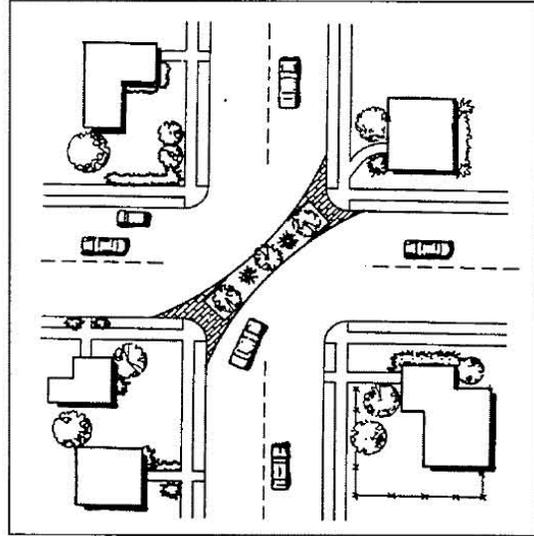
Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	<p><i>Volumes</i> Reduces through traffic volumes.</p> <p><i>Speed</i> May reduce speed.</p> <p><i>Traffic Noise and Air</i> Little to no effect.</p> <p><i>Traffic Safety</i> May improve safety of street.</p>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Eliminates through traffic.</li> <li>• Possibly reduces speed of remaining vehicles.</li> <li>• Can maintain pedestrian and bike access.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Increases emergency vehicle response times.</li> <li>• May cause inconvenience for some residents.</li> <li>• May divert traffic to other streets.</li> <li>• May require additional right-of-way acquisition.</li> <li>• Winter maintenance.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Cut through traffic volumes.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• There needs to be a minimum of 120 foot right-of-way to accommodate the minimum turning radius of 40 feet.</li> </ul>

## Full / Diagonal Diverter

### Purpose

A full diverter, sometimes called a diagonal diverter, is a raised barrier placed diagonally across an intersection that physically divides the intersection and forces all traffic to make a sharp turn.

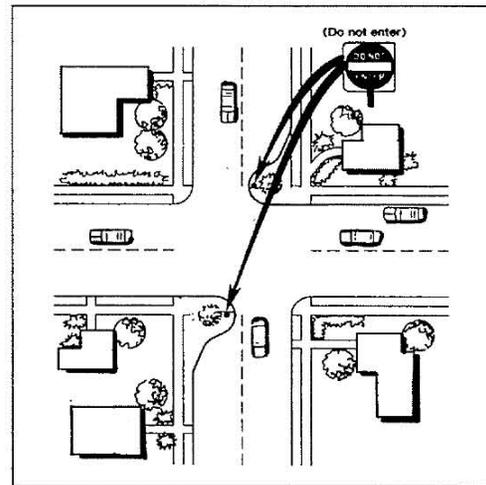


Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	
<i>Volumes</i>	May decrease traffic volumes.
<i>Speed</i>	May reduce speed.
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	Possible improvement.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Reduces traffic volumes.</li> <li>• Restricts vehicle access while maintaining bicycle and pedestrian access.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Prohibits or limits access and movement.</li> <li>• Restricts access for emergency vehicles.</li> <li>• May impact drainage.</li> <li>• May impact parking.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Cut through traffic.</li> <li>• Speed – forces driver to slow to make the turn.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• The curvature of the diverter is dependent on the intersection roadway widths.</li> <li>• Special care needs to be taken with drainage design.</li> <li>• The intent is to divert traffic to arterial and collector streets.</li> <li>• Needs to be good visibility approaching the diverter for drivers to react and navigate the turn safely.</li> </ul>

## Purpose

A partial-diverter is the narrowing of a two way street in order to eliminate one direction of travel. The concept can only be used at an intersection and attempts to reroute traffic attempting to use the protected street onto other roadways.



Source: Institute of Transportation Engineers  
Traffic Calming: State of Practice

<b>Effects</b>	
<i>Volumes</i>	Reduces traffic volumes in the eliminated direction.
<i>Speed</i>	Possible speed reduction.
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	Improved pedestrian crossing.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Allows for movement of emergency vehicles.</li> <li>• Reduces traffic volumes.</li> <li>• Allows two-way traffic on the remainder of the street.</li> <li>• Shorter pedestrian crossing at intersection.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Parking may be impacted and reduced.</li> <li>• Interrupts street network connectivity.</li> <li>• Emergency vehicles do have to drive around partial closure with care.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Excessive volumes on residential street.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Care has to be given in the design to not hinder unnecessarily emergency vehicles due to poor design.</li> </ul>

## Purpose

The effective use of public safety/police personnel to encourage reduced speeds in residential areas. Enforcement usually involves the use of radar to identify speeders and ticket violators.

Speed Watches rely on neighborhood participation to create awareness and, in turn, help control speeds in neighborhoods.



<b>Effects</b>	
<i>Volumes</i>	Little or no effect.
<i>Speed</i>	Speed reduction as long as enforcement is maintained (the “halo” effect of infrequent enforcement is as little as 1 mile or 4 hours).
<i>Traffic Noise and Air</i>	Little or no effect.
<i>Traffic Safety</i>	May reduce overall crashes if speeds are actually reduced.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Easy to implement.</li> <li>• Effective with repetitive enforcement on a non-routine basis.</li> <li>• Speed Watch programs have been perceived positively by neighborhood, even in areas where significant speed reductions were not measured. These types of programs may make neighborhoods find that they do not actually have a speeding problem.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Not self-enforcing; temporary measure, dependent on resources.</li> <li>• Expensive and not always desirable to use police for traffic enforcement due to budget and manpower constraints.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Speeding.</li> <li>• Moving vehicle violations.</li> <li>• Running stop signs.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• The locations of implementation should be clearly identified to minimize the time spent enforcing and maximize the resultant speed reduction.</li> <li>• Actual speed surveys should be used to narrow problem to specific time (day of the week, time of day) and location.</li> </ul>

## Variable Speed Display Board

### Purpose

A portable speed display board wired to a radar provides passing motorists their travel speed along with the speed limit. The display can help raise driver awareness, encourage compliance, and direct driver's attention to the posted speed limit. The purpose is to remind drivers that they are speeding to help encourage compliance.



<b>Effects</b>	
<i>Volumes</i>	Little or no effect
<i>Speed</i>	Lower observed speeds when device is present
<i>Traffic Noise and Air</i>	Little or no effect
<i>Traffic Safety</i>	There is the potential for sudden braking by some motorists.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Portable Display board can be used in various locations enabling residents to borrow and place on their street.</li> <li>• Low cost (\$2,000 to \$11,500 per unit).</li> <li>• Can be used to target timing and location of police enforcement (if data shows excessive speeds at a certain time).</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Possible concerns with causing conflict between citizens involved (vigilantism).</li> <li>• May only provide short term effectiveness.</li> <li>• Possible vandalism or could encourage aggressive drivers to see how fast they can go.</li> <li>• Needs power to function.</li> <li>• Requires personnel to move and place unit.</li> </ul>
<b>Problems Targeted</b>	<ul style="list-style-type: none"> <li>• Any location where speeding is a problem or where drivers need to be educated about traffic issues in the area.</li> </ul>
<b>Design</b>	<ul style="list-style-type: none"> <li>• Variety of types of variable speed display boards available – some include traffic counting abilities.</li> </ul>