VILLAGE OF OAK PARK
TRANSPORTATION COMMISSION MEETING
MONDAY FEBRUARY 27, 2017 - 7:00 PM
COUNCIL CHAMBERS - VILLAGE HALL

AGENDA

1. Call to Order

2. Non-agenda Public Comment - up to 15 minutes

3. Agenda Approval

4. Approval of Draft Transportation Commission Meeting Minutes

   4.1 Draft December 12, 2016 Transportation Commission meeting minutes

5. UPDATE ON THE PARKING STUDY

   5.1 Staff Agenda Item Commentary
   5.2 Two Examples for Parking Guide
   5.3 Articles in Support of Parking Guide Signs

6. CONTINUED DEVELOPMENT OF THE TRAFFIC CALMING TOOLBOX

   6.1 Staff Agenda Item Commentary
   6.2 Examples from Other Neighborhood Traffic Management Programs
   6.3 Continued Development of the Traffic Calming Toolbox Agenda Documents & Meeting Minutes from the August 22, 2016 Transportation Commission Meeting

7. OTHER ENCLOSURES

   OE1 12 Months of P&T Traffic Action Item Activity Summary February 2016 – January 2017

8. Adjourn

DRAFT Meeting Minutes
Transportation Commission
Monday, December 12, 2016
Council Chambers – Village Hall

Call to Order and Roll Call

Chair Chalabian called the meeting to order at 6:59 PM.

Present: Jack Chalabian, Kyle Eichenberger, Michael Stewart, Mark Patzloff, James Thompson, Joel Schoenmeyer

Excused: Craig Chesney

Staff: Mike Koperniak, John Youkhana, Mary Avinger

There was no non-agenda public testimony.

Approval of Tonight's Meeting Agenda

Commissioner Thompson motioned to approve the agenda as presented and was seconded by Commissioner Stewart. The motion was approved by a unanimous voice vote.

Approval of the Draft November 28, 2016 Meeting Minutes

Commissioner Eichenberger motioned to approve the draft November 28, 2016, Transportation Commission meeting minutes and was seconded by Commissioner Thompson. The motion was approved by a unanimous voice vote.

REVIEW THREE DRAFT VILLAGE-WIDE WAYFINDING SIGN SYSTEM DESIGNS

John Youkhana, the Assistant Parking Director, gave a brief presentation on the draft Village-wide wayfinding sign system designs and explained that staff would like to get the Commission's thoughts, opinions, and recommendations.

Chair Chalabian opened the discussion by asking if all Commissioners had a chance to review the three options and the Commissioners responded they did.

Commissioner Patzloff asked if the colors were set in stone and John Youkhana responded that everything is open to change.

Commissioner Eichenberger stated he likes design 3's motif but likes design 1's fonts.

Commissioner Stewart likes the Windows design the most, and then Grasslands, t modern design last. He thinks that the light gray on dark gray requires better contrast and that the Windows design is a nod to Frank Lloyd Wright.

Commissioner Thompson likes design one the most for its simplicity, then design three, then design two last.

Commissioner Schoenmeyer also liked design one the most, then design three, then design two last. He liked the Frank Lloyd Wright influence and feels that design one is functional, easy to read, and see. Commissioner Schoenmeyer feels that fancier design elements should be avoided.

Chair Chalabian stated that on page 17 of 49, the crosswalks will look good for a short while then start to fade; need to think of ongoing maintenance. He would like to see simple things; make it simple and sustainable.

Chair Chalabian stated design two and three looks great on paper and that he likes the modern look. He thinks there are some elements of the current signs that look good. Chair Chalabian supports design one but, thinks there is a way to pull elements from all three designs for one good design. He thinks all concepts look nice but design one is modern and more fitting to Village and agrees with Commissioner Stewart on some of the color issues – signs should be easy to read in day or night.

Chair Chalabian stated on big maps, Village should look at heads up versus north up orientation. For map kiosk in CTA stations, the Village should involve CTA with wayfinding signs to coordinate with their neighborhood maps inside stations.

Chair Chalabian thinks there should be a bread crumb and funnel approach – signs should provide more details the closer you reach your destination. Also the font has to be made more to contrast because signs need to be seen in low light. Chair Chalabian stated the Village also needs to consider how the Public Works Department would maintain the signs.

Commissioner Patzloff asked if any of the signs are reflective or will light up. John Youkhana responded there are rules about lights and reflective materials on signs depending on size but some parking signs will be lit.

Chair Chalabian stated whatever signs are chosen should be warm, inviting, inclusive of the environment, and have good lighting but should last a long time.

Commissioner Stewart likes design three because it gives a nod to the Frank Lloyd Wright prairie style which attracts tourists.

John Youkhana summarized the Commissioner's comments:

Commissioner	+		-
Patzloff	Design 1	Design 3	Design 2
Stewart	Design 3	Design 1	Design 2
Chalabian	Design 1 and 3 tied		Design 2
Eichenberger	Design 3	Design 1	Design 2
Thompson	Design 1	Design 3	Design 2
Schoenmeyer	Design 1	Design 3	Design 2

Hot Topics
Font in #1 is good
Consider Legibility
Better Contrast In colors
Simple not complex
Consider Sustainability
Consider Initial Costs
Easy to Read
East to Understand for end-user (visitor)
Historic Touch
Hybrid of best things from all 3
Use Heads Up vs North Up Method
Consider Night Visibility
Consider Weather Visibility
Consider easy to use Brackets and Banning's
Consider Maintenance Friendly Materials
No to Street Painting
Use Bread Crum Philosophy

Chair Chalabian asked about the January agenda and Mike Koperniak responded that he will email the Commission with details.

Commissioner Stewart motioned to adjourn the meeting and the motion was seconded by Commissioner Schoenmeyer.

The voice vote was unanimous to adjourn the meeting.

The meeting was adjourned at 7:35 PM.

Respectively submitted

Mary Avinger

Mary Avinger,
Administrative Secretary

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Village Of Oak Park

Transportation Commission Agenda Item

Item Title: **Pilot Project of a New Consolidated On-Street Parking Restriction Sign Design**

Review Date: February 27, 2017

Prepared By: Parking and Mobility Services

Abstract (briefly describe the item being reviewed):

Over the last year and a half staff has been reviewing alternatives to the 10,000+ parking restriction signs posted throughout the Village.

As part of an effort to consolidate signage and improve understanding of parking restrictions Staff has been researching ideas from around the country. One idea that seems to be receiving a positive reaction is a design by a woman named Nikki Sylianteng who is a former resident of Los Angeles and a current resident of Brooklyn. Sylianteng's came up with an idea to change the traditional text-based design of parking regulation signage in a visual explanation that would answer two main questions: "Can I park here? And for how long?".

This sign design consists of a parking schedule that shows all 24 hours for every day of the week. The times you can park are marked in green and the times you cannot park are marked in red.

Currently there are several different iterations of the sign design being piloted in Columbus (OH), Fargo (ND), Los Angeles (CA), New Haven (CT), Washington (DC), Brisbane, Sydney, Montreal, and Vancouver.

Staff Recommendation(s):

Based on comments received from Oak Park residents and businesses that current restriction signs are confusing. Staff will be recommending to The Village Board starting a pilot project with this new sign design.

However, a review of regulations and consolidation/change of restrictions in some areas of the Village will need to happen because there is still a finite area to put information on the new sign design. The review will take place through the parking study process.

Supporting Documentation Is Attached

PARKING GUIDE

	MON-FRI	SAT & SUN
6 am –	P	P
8 am –	No Parking	P
10 am –	P	P
2:30 am –	No Parking	No Parking

No Parking after 2 inches of snow

Even Dates 8am-6pm - TOW ZONE

Overnight Parking Pass **ZONE 206**

DOWNLOAD the PassportParking App

OR CALL 708-716-0176

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PARKING GUIDE

	M, T, TH, F	WED	SAT & SUN
6 am –	P	P	P
8 am –	P	P̸	
10 am –	P 2 Hour Parking	P 2 Hour Parking	
5 pm –	P	P	
2:30 am –	P̸ Except Y2 Permit	P̸ Except Y2 Permit	P̸ Except Y2 Permit

No Parking after 2 inches of snow

Even Dates 8am-6pm - TOW ZONE

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New Haven trying out parking program

Posted: Jan 15, 2016 5:32 PM CSTUpdated: Jan 15, 2016 5:32 PM CST
By Matt McFarland
CONNECT
By Joseph Wenzel IV, News Editor
CONNECT

A new design for parking signs hopes to clear up some confusion in downtown New Haven. (WFSB)

NEW HAVEN, CT (WFSB) -

New Haven officials are making a push to make parking easier in the elm city.

New Haven is testing out new street signs it hopes will clear up some confusion about where and when you can park downtown. Certain hours you can't park, certain days you can't park and there's even time limits. It can be pretty confusing, so now the city of New Haven is rolling out a pilot program here. They are hoping it will make it a lot easier for folks parking downtown.
"The fact that this is there will be really helpful for a lot of people because they always come in asking, ‘can we park here,’" Kassandra Leiva with the Merwin's Art Shop said.

That's the whole point of these new parking signs posted in Downtown New Haven.

Along with Los Angeles, the Elm City just the second United States city to test out the redesigned signs. The visual chart shows the days and times when people can and cannot park along with for how long and if there are restrictions like a loading zone.

"We're rolling these out at our largest visitor attractions,” New Haven Director of Transportation, Traffic & Parking Doug Hausladen said. “Chapel Street, the British Arts Center, Yale Gallery, as well as

Orange Street, here at Government Center, which is notoriously known as our number one ticket area in the city."

In fact, Hausladen said it hands out roughly 100,000 tickets a year, something it's hoping to cut down on.

"I can definitely see, look at the day that's blocked out, can say, oh I've only got two hours, to park," Dowin Boatright, of New Haven, said looking at the new signs. "With that sign, I always had trouble, is today the day?"

City officials said that's the whole point.

"Communicate with them better and to make parking a little more convenient and easier to understand," Hausladen said.

"Once you take a look at it for a few seconds, as a visual person, it seems clear to me. It shows who can park where and when," Leiva said.

It's just a pilot program. The city said the signs will be up for the next three to four months and it wants you to contact them to let them know what you think about it.

For all the information on the signs, click here or by calling the city at 203-946-8075. People can keep up with updates by clicking here or here.

From: http://www.wfsb.com/story/30979777/new-haven-trying-out-parking-program

LA's New Parking Signs Are Brilliant and Every City Should Copy Them

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Alissa Walker
4/06/15 2:00pm
Filed to: URBANISM

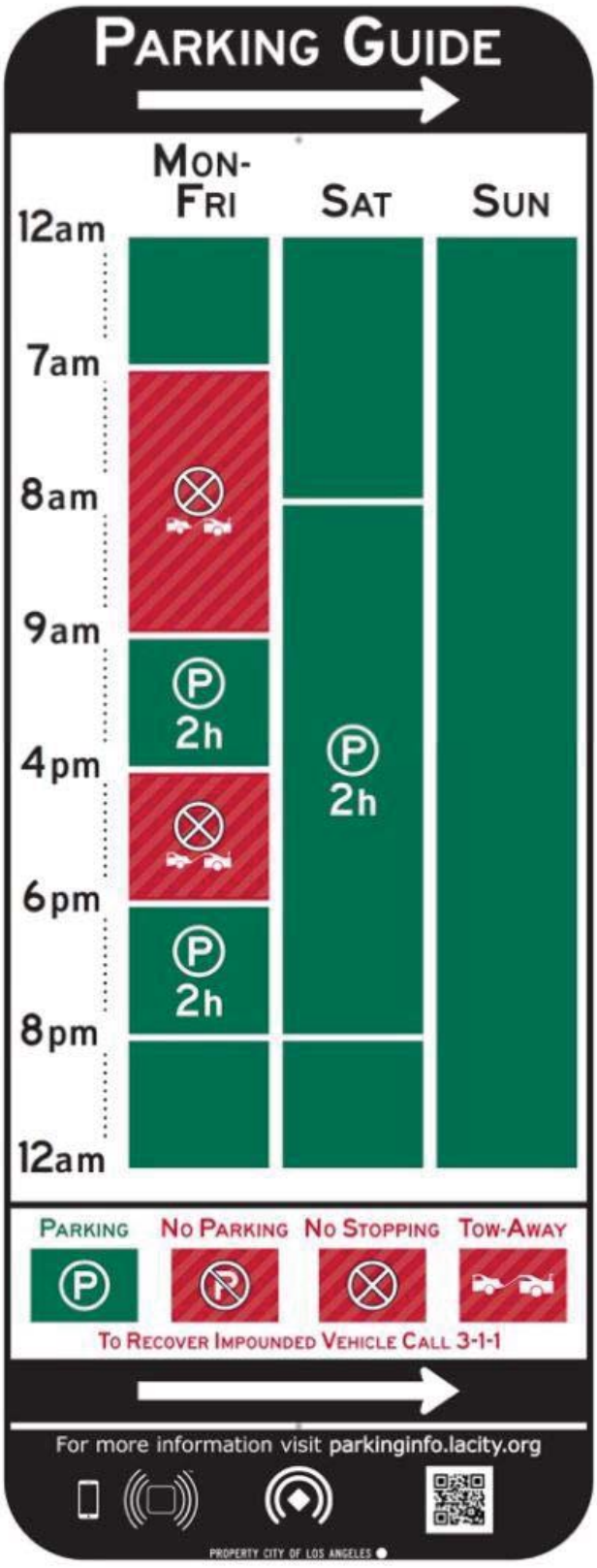
186.5K

19727

In the quest to make parking suck less, there are apps that help you find a space, and meters where you can pay with a swipe of your credit card. But LA has launched a simple, low-tech solution to make parking better: Well-designed signage that offers no ambiguity whatsoever when it comes to where you can park, when you can park there, and how much it will cost.

A proposal by designer Nikki Sylianteng caught the eyes of incoming LADOT director Seleta Reynolds last fall, who made it part of her mandate to redesign the city's signage. New York City got a redesign of its parking signs in 2013, but these are even clearer (and to be honest, LA's existing parking signage is much worse). About 100 signs will be installed as part of a pilot program in a 15-block area of downtown Los Angeles.

Here's a sample sign up close. What do you think?



The idea of truly "smarter" parking signs will eventually mean that we won't need them at anymore—your connected car will be able to tell you where it's okay to park; your autonomous

shared vehicle won't need a parking spot at all. But this is a nice improvement. Plus t look way cleaner on the street.

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My one quibble is that there should be a third color, that shows time-limited parking. It makes sense that red means 'no parking' and green means 'ok to park,' but I'd want to see a distinction between unrestricted parking and 2-hour parking, for example. Maybe a shade of yellow?

In addition, these signs have a tech upgrade as well. The new signage has Bluetooth beacons which can transmit data to nearby smartphones and connected vehicles. They eventually might automatically give you information about nearby community events—or be able to remind you that your parking meter is about to expire, if you didn't read the sign.
[LAMayor.org]

LA Mayor Eric Garcetti installs the first sign last Friday; Photo via LA Mayors Office

From: http://gizmodo.com/las-new-parking-signs-are-brilliant-and-every-city-shou-1695594041

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Village Of Oak Park

Transportation Commission Agenda Item

Item Title: Continued Development of the Traffic Calming Toolbox

Review Date: February 27, 2017

Prepared By: Jill Juliano

Abstract (briefly describe the item being reviewed):

Tonight's meeting is a continuation of the Transportation Commission's work plan item to develop a traffic calming toolbox for use in more effectively addressing traffic calming petitions that are brought before it.

Staff Recommendation(s):

For tonight's meeting, the Commission will start to work on developing the list of traffic calming measures that the Village can use to address issues the submitted petitions and develop objective criteria for use in evaluating the validity and severity of petitions that are brought before the Commission for review.

Also, the scoring has not been finalized. The Commission will need to review and be prepared to discuss this aspect as well.

Because the Commission has not worked on the Traffic Calming Toolbox for six months, staff has included those agenda documents related to the development of the Traffic Calming Toolbox and the approved meeting minutes from the August 22, 2016 Transportation Commission meeting in this month’s agenda.

Supporting Documentation Is Attached

3. TOOLBOX

This chapter of the NTCP summarizes the "toolbox" of devices that are available to the Placer County Department of Public Works and community members when developing neighborhood traffic calming plans. The "toolbox" contains 31 different devices that address neighborhood traffic related concerns such as speeding vehicles, high traffic volumes, cut-through traffic, or collisions at neighborhood intersections. The devices vary in their ability to treat various traffic related concerns. For this reason, Chapter 4, "Toolbox Guidelines," provides guidance on selecting the most appropriate devices given the type of specific traffic-related concern and street being treated.

The "toolbox" of neighborhood traffic management devices can be grouped into three categories:

- Non-Physical devices
- Speed Control
  - Narrowing devices
  - Horizontal devices
  - Vertical devices
- Volume Control devices

For each device in the "toolbox," the following information relating to each device is provided:

- Description of the measure
- Photograph and/or schematic
- List of advantages and disadvantages
- Data sheet indicating speed, volume, or collision reduction potential
- Estimated costs

Cost approximations are based on 2006 costs and are provided for information purposes only. Actual costs depend on many factors, including dimensions of device, construction materials, and actual construction costs.

NON-PHYSICAL DEVICES

Description

Non-physical devices include any measures that do not require physical changes to the roadway. Non-physical devices are intended to increase drivers' awareness of surroundings and influence driver behavior without physical obstructions. DPW staff will initially implement non-physical devices to treat traffic related concerns. However, these devices are not self enforcing and may have limited effectiveness as stand-alone devices. This category includes the following devices:

- Targeted Speed Enforcement
- Speed Radar Trailers
- Speed Feedback Sign
- Centerline/Edgeline Lane Striping
- Optical Speed Bars
- Signage
- Speed Legend
- Centerline Botts Dots
- High Visibility Crosswalks
- Angled Parking

Targeted Speed Enforcement

County Staff or NTC members can identify locations for temporary targeted enforcement, based on personal observations and survey comments. A request can be submitted to the California Highway Patrol (CHP) for the desired enforcement. Because of limited CHP resources, the duration of the targeted enforcement may be limited. Targeted enforcement may also be used in conjunction with new neighborhood traffic management devices to help drivers become aware of the new restrictions.

Approximate Cost: No direct cost.

Advantages

- Inexpensive if used temporarily
- Does not physically slow emergency vehicles or buses
- Quick implementation

Disadvantages

- Expensive to maintain an increased level of enforcement
- Effectiveness may be temporary

Radar Trailer

A radar trailer is a device that measures each approaching vehicle's speed and displays it next to the legal speed limit in clear view of the driver. They can be easily placed on a street for a limited amount of time then relocated to another street, allowing a single device to be effective in many locations.

Approximate Cost: No direct cost. (Purchase $6,000 - $12,000)

Advantages

- Portable
- Does not physically slow emergency vehicles or buses
- Quick implementation

Disadvantages

- Effectiveness may be temporary
- Drivers may divert to alternate streets due to uncertainty of device implications
- Subject to vandalism

Speed Feedback Signs

Speed feedback signs perform the same functions as radar trailers but are permanent. Real-time speeds are relayed to drivers and flash when speeds exceed the limit. Speed feedback signs are typically mounted on or near speed limit signs.

Approximate Cost: $3,000 - $10,000

Advantages

- Real-time speed feedback
- Does not physically slow emergency vehicles or buses
- Permanent installation

Disadvantages

- May require power source
- Only effective for one direction of travel
- Long-term effectiveness uncertain
- Subject to vandalism

Centerline/Edgeline Lane Striping

Lane striping can be used to create formal travel lanes, bicycle lanes, parking lanes, or edge lines. As a neighborhood traffic management measure, they are used to narrow the travel lanes for vehicles, thereby inducing drivers to lower their speeds. The past evidence on speed reductions is, however, inconclusive.

Approximate Cost: $2.00 per linear foot

Advantages

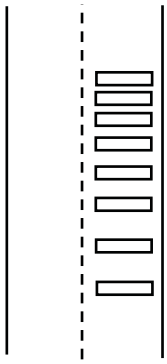
- Inexpensive
- Can be used to create bicycle lanes or delineate on-street parking
- Does not slow emergency vehicles

Disadvantages

- Has not been shown to significantly reduce travel speeds
- Requires regular maintenance

Optical Speed Bars

Optical speed bars are a series of pavement markings spaced at decreasing distances. They have typically been used in construction areas to provide drivers with the impression of increased speed. They do not provide long-term speed reduction benefits.



Advantages

- Inexpensive
- Does not physically slow emergency vehicles or buses

Disadvantages

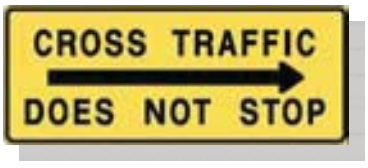
- Long-term effects in residential area unknown
- Increases regular maintenance

Approximate Cost: $1.00 per linear foot

Signage

Various signs may also also be useful in alerting driver of certain conditions. Examples include:

- "Cross Traffic Does Not Stop" Signs
- Truck Restriction Signs



Approximate Cost: $150 - $500 per sign

Advantages

- Inexpensive
- Truck restrictions can reduce through truck traffic
- Does not slow emergency vehicles or buses

Disadvantages

- Requires regular maintenance
- Speed limit signs are not applicable because they do not necessarily change driver behavior
- If speed limits are set unreasonably low, drivers are more likely to exceed it

Speed Legend

Speed legends are numerals painted on the roadway indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts. Speed legends can be useful in reinforcing a reduction in speed limit between one segment of a roadway and another segment. They may also be placed at major entry points into a residential area.

Approximate Cost: $75 per location

Advantages

- Inexpensive
- Helps reinforce a change in speed limit
- Does not slow emergency vehicles

Disadvantages

- Has not been shown to significantly reduce travel speeds
- Requires regular maintenance

Centerline Botts Dots

Botts dots, or "raised pavement markers," are small bumps lining the centerline or edgeline of a roadway. They are often used on curves where vehicles have a tendency to deviate outside of the proper lane, risking collision. Raised reflectors improve the nighttime visibility of the roadway edges.

Approximate Cost: $4.50 per marker

Advantages

- Inexpensive
- Does not physically slow emergency vehicles or buses
- Can help keep drivers in the appropriate travel lane on curves and under low-visibility conditions

Disadvantages

- Noise caused by Botts Dots
- Requires regular maintenance
- Has not been shown to significantly reduce travel speeds

High Visibility Crosswalks

High-visibility crosswalks use special marking patterns and raised reflectors to increase the visibility of a crosswalk. A "triple-four" marking pattern is created by painting two rows of four-foot wide rectangles, separated by four feet of unpainted space across the roadway. Raised reflectors are placed at the approach edges of these rectangles. The unpainted space along the center of the crosswalk provides an untreated path for wheelchair users and foot traffic, as markings may become slippery in rainy/wet conditions.

Advantages

- Increased visibility of crosswalk
- Focus crossing pedestrians at a single location

Disadvantages

- May give pedestrians a false sense of security, causing them to pay less attention to traffic
- Requires more maintenance than normal crosswalks

Approximate Cost: $1,600 per location

Angled Parking

Angled parking reorients on-street parking spaces to a 45-degree angle, increasing the number of parking spaces and reducing the width of the roadway available for travel lanes. Angled parking is also easier for vehicles to maneuver into and out of than parallel parking. Consequently, it works well in areas with high parking demand and turnover rates.

Approximate Cost: Dependent on amount of parking

Advantages

- Reduces speeds by narrowing the travel lanes
- Increases the number of parking spaces
- Provides for easier parking maneuvers that take less time than parallel parking
- Favored by businesses and multi-family residences

Disadvantages

- Precludes the use of bike lanes (unless roadway is wider than 58 feet)
- Ineffective on streets with frequent driveways
- Potential for collisions when backing out

SPEED CONTROL – NARROWING DEVICES

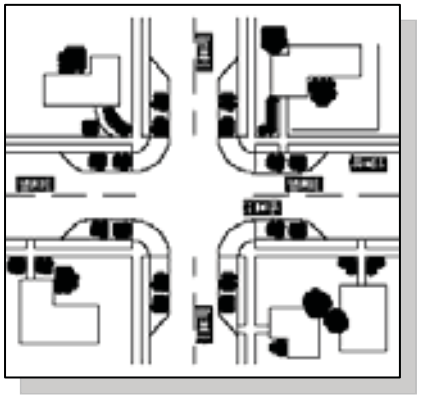
Description

Narrowing devices use raised islands and curb extensions to physically narrow the travel lane for motorists. The narrowing devices in the toolbox include:

- Neckdown/Bulbout
- Center Island Narrowing
- Two-Lane Choker
- One-Lane Choker

Neckdown/Bulbout

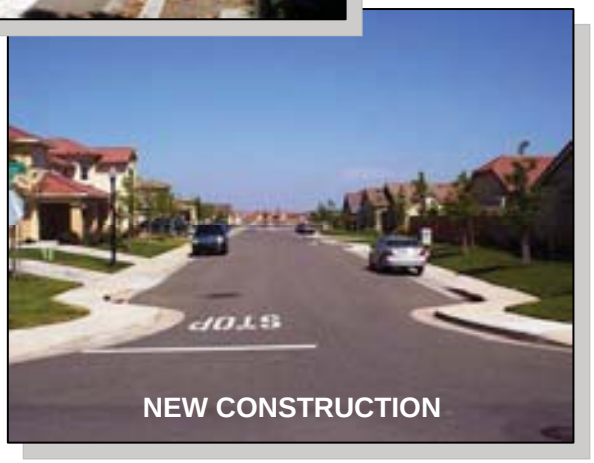
Neckdowns/bulbouts are raised curb extensions that narrow the travel lane at intersections or midblock locations. Neckdowns/bulbouts "pedestrianize" intersections by shortening the crossing distance and decreasing the curb radii, thus reducing turning vehicle speeds. Both of these effects increase pedestrian comfort and safety at the intersection.



The magnitude of speed reduction is dependent on the spacing of neckdowns between points that require drivers to slow (see page 55). On average, neckdowns achieve a 7 percent reduction in speeds.

Approximate Cost: $5,000 – $10,000 per corner

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-7%
Volume Reduction	Reduction in Vehicles per Day	-10%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		



Advantages

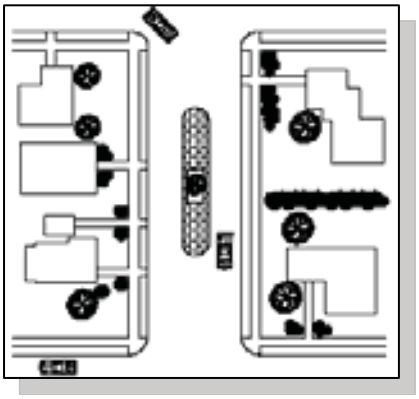
- Reduces pedestrian crossing distance and exposure to vehicles
- Through and left-turn movements are easily negotiable by large vehicles
- Creates protected on-street parking bays
- Reduces speeds (especially right-turning vehicles) and traffic volumes

Disadvantages

- Effectiveness is limited by the absence of vertical or horizontal deflection
- May slow right-turning emergency vehicles
- Potential loss of on-street parking
- May require bicyclists to briefly merge with vehicular traffic

Center Island Narrowing

Center island narrowings are raised islands located along the centerline of a street that narrow the travel lanes at that location. Placed at the entrance to a neighborhood, and often combined with textured pavement, they are often called "gateways." Fitted with a gap to allow pedestrians to walk through at a crosswalk, they are often called "pedestrian refuges." They can also be landscaped to increase visual aesthetics.



The magnitude of speed reduction is dependent on the spacing of center island narrowings between points that require drivers to slow (see page 55). On average, center island narrowings achieve a 7 percent reduction in speeds.

Approximate Cost: $5,000 - $10,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-7%
Volume Reduction	Reduction in Vehicles per Day	-10%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

FITTED WITH PEDESTRIAN REFUGE

UPGRADED AESTHETICS

Advantages

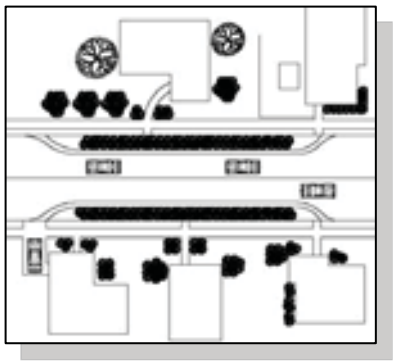
- Can increase pedestrian safety
- Aesthetic upgrades can have positive aesthetic value
- Reduces traffic volumes if alternative routes are available

Disadvantages

- Effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- Potential loss of on-street parking

Two-lane choker

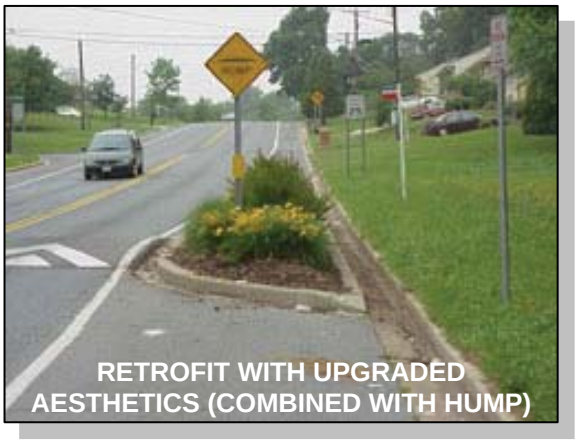
Chokers are curb extensions at midblock that narrow a street. Chokers leave the street cross section with two lanes that are narrower than the normal cross section.



The magnitude of speed reduction is dependent on the spacing of two-lane chokers between points that require drivers to slow (see page 55). On average two-lane chokers achieve a 7 percent reduction in speeds.

Approximate Cost: $7,000 - $8,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-7%
Volume Reduction	Reduction in Vehicles per Day	-10%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		



RETROFIT WITH UPGRADED AESTHETICS (COMBINED WITH HUMP)

NEW CONSTRUCTION

Advantages

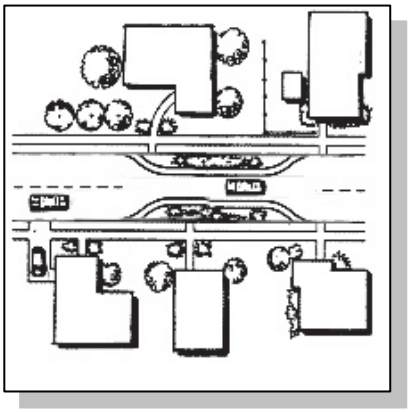
- Easily negotiable by emergency vehicles and buses
- Can have positive aesthetic value
- Reduces both speeds and volumes

Disadvantages

- Effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- May require bicyclists to briefly merge with vehicular traffic
- Loss of on-street parking
- Build-up of debris in gutter

One-lane choker

One-lane chokers narrow the roadway width such that there is only enough width to allow travel in one direction at a time. They operate similarly to one-lane bridges, where cars approaching on one side must wait until all traffic in the other direction has cleared before proceeding.



The magnitude of speed reduction is dependent on the spacing of one-lane chokers between points that require drivers to slow (see page 55). On average, one-lane chokers achieve a 14 percent reduction in speeds.

Approximate Cost: $8,000 - $9,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-14%
Volume Reduction	Reduction in Vehicles per Day	-20%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

Advantages

- Maintains two-way vehicle access, except at choker
- Very effective in reducing speeds and traffic volumes

Disadvantages

- Perceived as unsafe because opposing traffic is vying for space in a single lane
- Can be used only on low-volume, low speed roads
- Loss of on-street parking

SPEED CONTROL – HORIZONTAL DEVICES

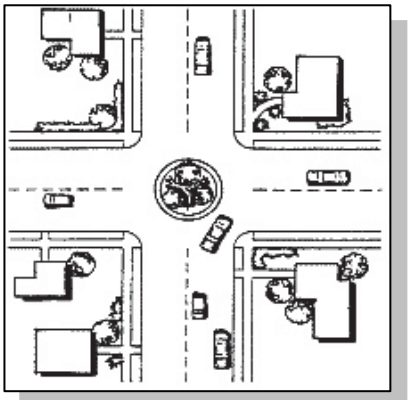
Description

Horizontal deflection devices use raised islands and curb extensions to physically eliminate straight-line paths along roadways and through intersections. The horizontal deflection devices in the toolbox include:

- Traffic Circle
- Roundabout (Single-Lane)
- Chicane
- Lateral Shift
- Realigned Intersection

Traffic Circle

Traffic circles are raised islands, placed in intersections, around which traffic circulates. Stop signs or yield signs can be used as traffic controls at the approaches of the traffic circle. Circles prevent drivers from speeding through intersections by impeding the straight-through movement and forcing drivers to slow down to yield. Depending upon the size of the intersection and circle, trucks may be permitted to turn left in front of the circle.



The magnitude of speed reduction is dependent on the spacing of traffic circles between points that require drivers to slow (see page 55). On average, traffic circles achieve an 11 percent reduction in speeds and a dramatic 71 percent decrease in collisions.

Approximate Cost: $10,000 - $25,000 per location

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	-11%
Volume Impacts	Reduction in Vehicles per Day	-5%
Safety Impacts	Reduction in Average Annual Number of Collisions	-71%
Source: Traffic Calming: State of the Practice, 2000.		

Advantages

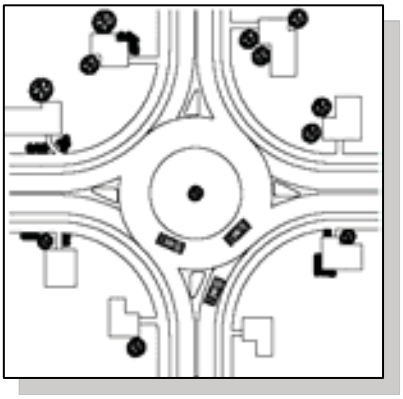
- Very effective in moderating speeds and improving safety
- Can have positive aesthetic value

Disadvantages

- If not designed properly, difficult for emergency vehicles or large trucks to travel around
- Must be designed so that the circulating traffic does not encroach on crosswalks
- Potential loss of on-street parking

Roundabout (single-lane)

Like traffic circles, roundabouts require traffic to circulate counterclockwise around a center island. But unlike circles, roundabouts are used on higher volume streets to allocate right-of-way among competing movements. They are found primarily on collector streets, often substituting for traffic signals. They are larger than neighborhood traffic circles, have raised splitter islands to channel approaching traffic to the right, and do not have stop signs. Due to large amount of required right-of-way and construction costs, roundabouts may be most appropriate for new developments.



Roundabouts have an insignificant effect in reducing traffic speeds, but serve to allocate right-of-way at an intersection similar to a traffic signal. On average, roundabouts can reduce the average number of accidents up to 33 percent when compared to a signalized intersection.

Approximate Cost: Varies by intersection and whether new construction or a retrofit.

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Impacts	Reduction in Vehicles per Day	I/D
Safety Impacts	Reduction in Average Annual Number of Collisions	-15% to -33%
Note: I/D = Insufficient Data to predict reduction effect. Source: Roundabouts: An Informational Guide, 2000.		

Advantages

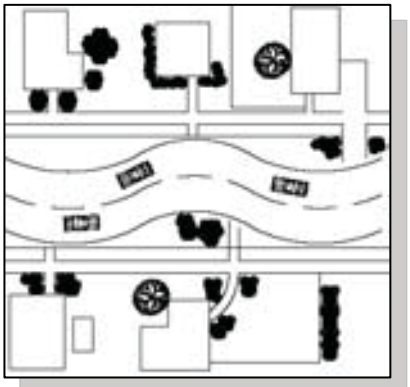
- Enhanced vehicle safety compared to a traffic signal or stop sign
- Minimizes queuing at approaches to the intersection
- Less expensive to operate than traffic signals
- Can have positive aesthetic value
- Shorter pedestrian crossing distance

Disadvantages

- May require major reconstruction of an existing intersection
- Loss of on-street parking
- Continuous flow of traffic limits opportunity for pedestrians to cross (compared to signal)

Chicane

Chicanes are curb extensions that alternate from one side of the street to the other, forming S-shaped curves. Chicanes can also be created by alternating on-street parking between one side of the road and the other. Each parking bay can be created either by restriping the roadway or by installing raised center islands at each end, creating a protected parking area. Chicanes have limited effectiveness in reducing traffic speeds and volumes as compared to other devices. Little data has been collected to predict the reduction in speed, traffic volumes, or collisions, and use of this device may not result in significant decreases. Resources permitting, DPW staff can collect before and after data to determine the effectiveness of chicanes.



Approximate Cost: $8,000 - $14,000 per location

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Impacts	Reduction in Vehicles per Day	I/D
Safety Impacts	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient data to predict reduction effect.		

RETROFIT WITH
STANDARD TREATMENT

RETROFIT WITH
UPGRADED AESTHETICS

Advantages

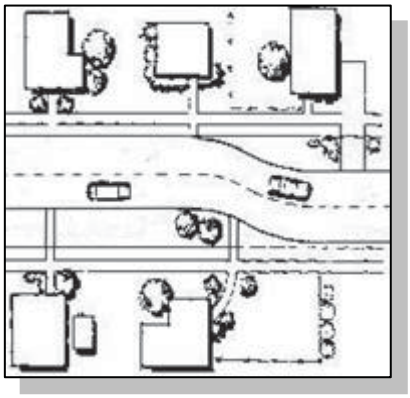
- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by emergency vehicles and buses

Disadvantages

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be costly, especially if there are drainage issues
- Loss of on-street parking

Lateral Shift

Lateral shifts are curb extensions on otherwise straight streets that cause a shift in the travel. Lateral shifts, with just the right degree of deflection, can be effective. However, lateral shifts have had limited use in the United States, and, consequently, insufficient data prevents accurate prediction of speed reduction and traffic volumes.



Approximate Cost: Dependent on size of offset and length of transition

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Vehicles per Day	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect.		

Advantages

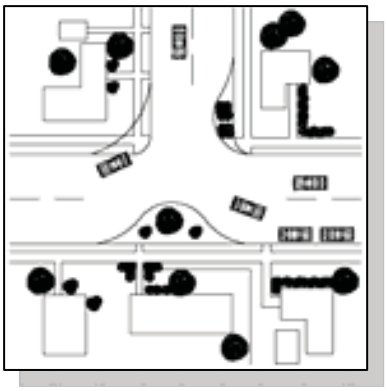
- Can accommodate higher traffic volumes than many other neighborhood traffic management measures
- Easily negotiable by large emergency vehicles and buses

Disadvantages

- Potential for loss of on-street parking
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane

Realigned Intersection

Realigned intersections provide deflection on an otherwise straight approach of a T-intersection. By providing deflection in the form of a curb extension or realignment, drivers are required to slow through the intersection or come to a stop before turning. Little data has been collected to predict the reduction in speed, traffic volumes, or collisions, and use of this device may not result in significant decreases. Resources permitting, DPW staff can collect before and after data to determine the effectiveness of realigned intersections.



Approximate Cost: $15,000 - $30,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Vehicles per Day	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect.		

Advantages

- Can be effective at reducing speeds at T-intersections
- Can be effective in increasing safety at T-intersections

Disadvantages

- Modifying curbs or drainage can be costly
- Acquiring additional right-of-way can be costly

SPEED CONTROL – VERTICAL DEVICES

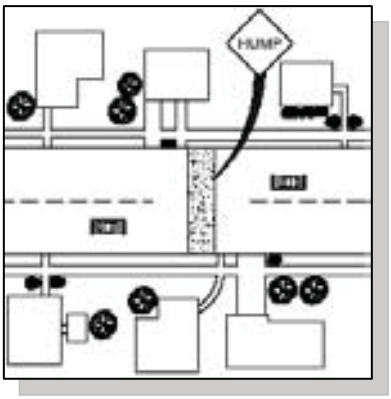
Description

Vertical deflection devices use variations in pavement height and alternative paving materials to physically reduce travel speeds. The design speeds for these devices are approximately 15 to 20 mph depending on the device. The vertical deflection devices in the toolbox include:

- Speed Hump
- Speed Lump
- Speed Cushion
- Speed Table
- Raised Crosswalk
- Rumble Strip
- Raised Intersection
- Textured Pavement

Speed Hump

Speed humps are rounded raised areas placed across the road. They are generally 12 feet long (in the direction of travel), 3 to 3 ½ inches high, parabolic in shape, and have a design speed of 15 to 20 mph. They are usually constructed with a taper on each side to allow unimpeded drainage between the hump and curb. When placed on a street with rolled curbs or no curbs, bollards are placed at the ends of the speed hump to discourage vehicles from veering outside of the travel lane to avoid the device.



The magnitude of reduction in speed is dependent on the spacing of speed humps between points that require drivers to slow (see page 55). On average, speed humps achieve a 22 percent reduction in speeds.

Approximate Cost: $2,000 - $3,000 per location

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	-22%
Volume Impacts	Reduction in Average Daily Traffic	-18%
Safety Impacts	Reduction in Average Annual Number of Collisions	-13%
Source: Traffic Calming: State of the Practice, 2000.		

Advantages

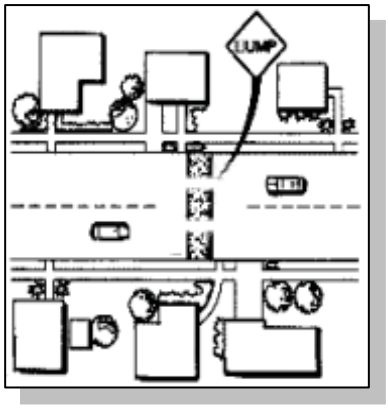
- Relatively inexpensive
- Relatively easy for bicyclists to cross
- Very effective in slowing travel speeds

Disadvantages

- Causes a “rough ride” for drivers, and can discomfort people with certain skeletal disabilities
- Slows emergency vehicles and buses
- Aesthetics
- Signs may be unwelcome by adjacent residents
- Increased noise for nearby residents

Speed Lump

The speed lump is a variation on the speed hump, adding two wheel cut-outs designed to allow large vehicles, such as emergency vehicles and buses, to pass with minimal slowing. The design limits passenger cars and mid-size SUVs from fully passing through the cut-outs, but allows one set of wheels to pass through the cut-out while the other set is required to travel over the lump.



The magnitude of speed reduction is dependent on the spacing of speed lumps between points that require drivers to slow (see page 55). Speed lumps have a similar reduction in speeds when compared to speed humps.

Approximate Cost: $2,000 - $3,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D, but comparable to speed humps
Volume Reduction	Reduction in Average Daily Traffic	
Safety Reduction	Reduction in Average Annual Number of Collisions	
Note: I/D = Insufficient Data to predict reduction effect.		

Advantages

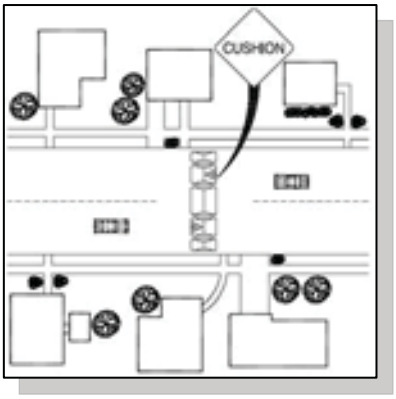
- Effective in reducing speeds
- Maintains rapid emergency response times
- Relatively easy for bicyclists to cross

Disadvantages

- Passenger vehicles with wide wheel base can pass through the lump using the wheel cut-outs
- Aesthetics
- Signs may be unwelcome by adjacent residents
- Increased noise for nearby residents

Speed Cushion

Speed cushions are a variation of the speed lump that is constructed from durable recycled rubber. These prefabricated devices consistently have a more uniform shape than asphalt humps. Speed cushions provide wheel gaps for emergency vehicles and buses, and can be arranged to fit any street width.



The magnitude of speed reduction is dependent on the spacing of speed cushions between points that require drivers to slow (see page 55). On average, speed cushions achieve a 14 percent reduction in speeds.

Approximate Cost: $4,500 - $6,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-14%
Volume Reduction	Reduction in Average Daily Traffic	Comparable to Speed Lumps
Safety Reduction	Reduction in Average Annual Number of Collisions	
Source: City of Portland, Rubber Speed Bump Research, 1995.		

Advantages

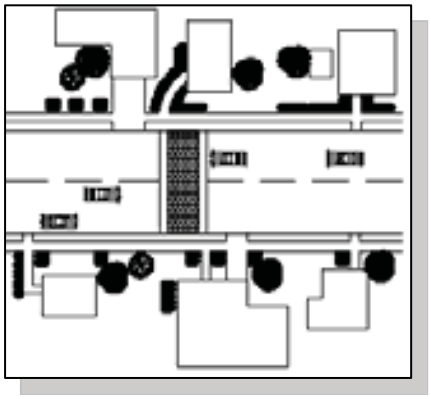
- Provides a more consistent ride than asphalt humps
- Can be used as a temporary device during a testing phase
- Reduces impacts to emergency vehicles due to cut-outs
- Easily accommodates street resurfacing

Disadvantages

- Aesthetics (but may be better than lumps)
- Signs may be unwelcome by adjacent residents
- Increased noise for nearby residents

Speed Table

Speed tables are flat-topped speed humps approximately 22 feet long. They are typically long enough for the entire wheelbase of a passenger car to rest on top. Their long, flat fields, plus ramps that are more gently sloped than speed humps, give speed tables higher design speeds than humps, and, thus, may be more appropriate for streets with higher ambient speeds. Brick or other textured materials improve the appearance of speed tables, draw attention to them, and may enhance safety and speed reduction.



The magnitude of speed reduction is dependent on the spacing of speed tables between points that require drivers to slow (see page 55). On average, speed tables achieve an 18 percent reduction in speeds.

Approximate Cost: $4,000 for basic treatment

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	-18%
Volume Impacts	Reduction in Vehicles per Day	-12%
Safety Impacts	Reduction in Average Annual Number of Collisions	-45%
Source: Traffic Calming: State of the Practice, 2000.		

STANDARD TREATMENT

UPGRADED AESTHETICS

Advantages

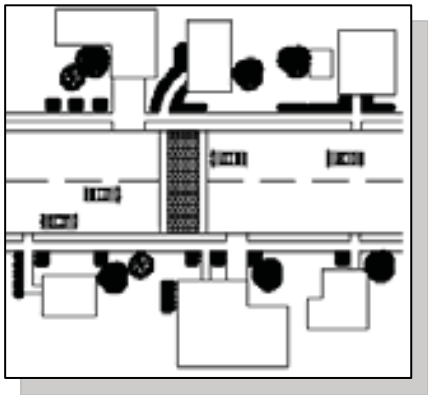
- Smoother on large vehicles (such as fire trucks) than speed humps
- Effective in reducing speeds, though not to the extent of speed humps

Disadvantages

- Aesthetics
- Textured materials, if used, can be expensive
- Signs may be unwelcome by adjacent residents
- Increased noise for nearby residents

Raised Crosswalk

Raised crosswalks are speed tables striped with crosswalk markings and signage to channelize pedestrian crossings, providing pedestrians with a level street crossing. Also, by raising the level of the crossing, pedestrians are more visible to approaching motorists.



The magnitude of speed reduction is dependent on the spacing of raised crosswalks between points that require drivers to slow (see page 55). On average, raised crosswalks achieve an 18 percent reduction in speeds.

Approximate Cost: $5,000 for basic treatment

Measured Effectiveness		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	-18%
Volume Impacts	Reduction in Vehicles per Day	-12%
Safety Impacts	Reduction in Average Annual Number of Collisions	-45%
Source: Traffic Calming: State of the Practice, 2000.		

STANDARD TREATMENT

UPGRADED AESTHETICS

Advantages

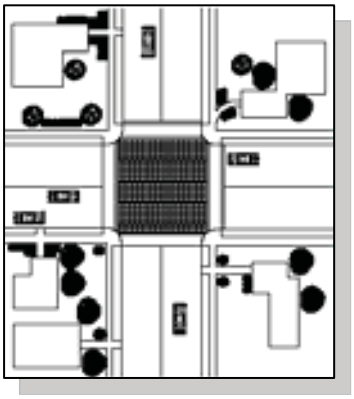
- Improve safety for both vehicles and pedestrians
- Aesthetic upgrades can have positive aesthetic value
- Effective in reducing speeds, though not to the extent of speed humps

Disadvantages

- Textured materials, if used, can be expensive
- Impact to drainage needs to be considered
- Textured pavement can increase noise to adjacent residents
- Signs may be unwelcome by adjacent residents

Raised Intersection

Raised intersections are flat raised areas covering entire intersections, with ramps on all approaches. They usually rise to sidewalk level, or slightly below, to provide a "lip" for the visually impaired. By modifying the level of the intersection, the crosswalks are more readily perceived by motorists to be a pedestrian area. They are particularly useful where loss of on-street parking due to other traffic calming devices is considered unacceptable. Raised intersections are ineffective at reducing traffic speeds or volumes.



Approximate Cost: Varies based on size of intersection

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-1%
Volume Reduction	Reduction in Average Daily Traffic	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

Advantages

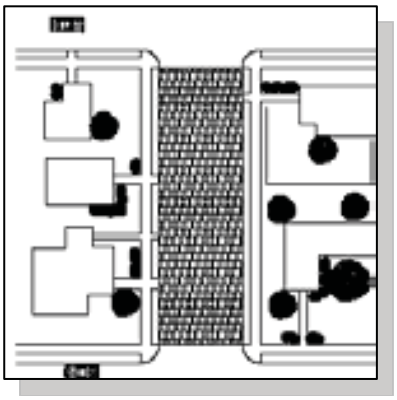
- Can improve safety for pedestrians and motorists
- Aesthetic upgrades can have positive aesthetic value
- Can treat two streets at once

Disadvantages

- Less effective in reducing vehicle speeds than speed humps and speed tables
- Expensive, particularly as a retrofit
- Textured pavement can increase noise to adjacent residents

Textured Pavement

Textured colored pavement includes the use of stamped pavement (asphalt) or alternate paving materials to create an uneven surface for vehicles to traverse. Textured pavement may have limited effectiveness as a standalone device and should be used to supplement other devices such as raised crosswalks or center median islands. Little data has been collected to predict the reduction in speed, traffic volumes, or collisions, and use of this device may not result in significant decreases. Resources permitting, DPW staff can collect before and after data to determine the effectiveness of textured pavement.



Approximate Cost: $8.00 per square foot

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Average Daily Traffic	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect.		

Advantages

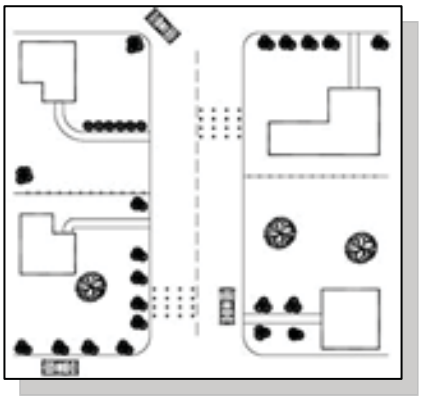
- Can reduce vehicle speeds
- Aesthetic upgrades can have positive value
- Placed at an intersection, it can slow two streets at once

Disadvantages

- Expensive, varying by materials used
- Can be uncomfortable for bicyclists or handicapped.
- Textured pavement can increase noise to adjacent properties

Rumble Strip

Rumble strips are closely spaced raised pavement markers at regular intervals on the roadway that create noise and vibration to the vehicle. Rumble strips can be used to warn drivers of a change in speed limit, leading up to a residential or school area, and upcoming stop sign or intersection. Rumble strips should be used only in areas where the noise impact would be minimal. Little data has been collected to predict the reduction in speed, traffic volumes, or collisions, and use of this device may not result in significant decreases. Resources permitting, DPW staff can collect before and after data to determine the effectiveness of rumble strips.



Approximate Cost: $500 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Average Daily Traffic	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect.		

Advantages

- Relatively inexpensive
- Can be effective in slowing travel speeds in specific locations

Disadvantages

- Raised pavement markers can be slippery when wet
- Increased noise in vicinity of rumble strips
- Maintenance of raised pavement markers
- Aesthetics
- Uncomfortable for motorcyclists and bicyclists

VOLUME CONTROL – DEVICES

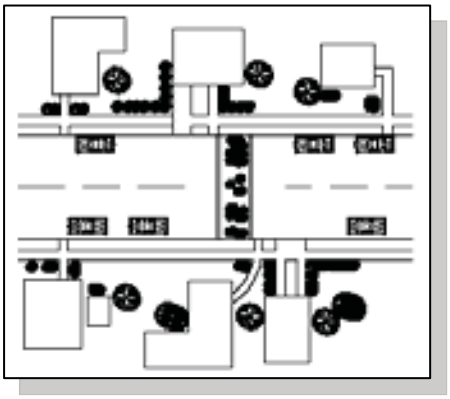
Description

Diversion devices use raised islands and curb extensions to physically preclude particular vehicle movements, such as left-turn or through movements, usually at an intersection. These devices can be considered only after all other devices have been attempted and failed to resolve the traffic problem. The diversion devices in the toolbox include:

- Full Closure
- Partial Closure
- Diagonal Diverter
- Median Barrier
- Forced Turn Island
- Turn-Movement Restriction

Full Closure

Full street closures are barriers placed across a street to close the street completely to through traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car. Emergency vehicles can be accommodated via removable bollards or similar devices.



Approximate Cost: $30,000 - $100,000 per location (dependent on size and treatment)

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Vehicles per Day	-44%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

Advantages

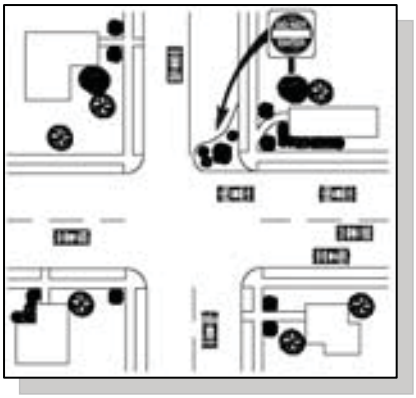
- Very effective in reducing cut-through traffic volumes
- Able to maintain pedestrian and bicycle connectivity

Disadvantages

- Requires statutory actions for public street closures
- Causes circuitous routes for local residents
- Diverts traffic to another street
- Delays for emergency services unless through access is provided
- May limit access to businesses
- Cost

Partial Closure

Half street closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. Half closures are the most common volume control measure after full street closures. Half closures are often used in sets to make travel through neighborhoods with a grid street pattern circuitous rather than direct.



Approximate Cost: $5,000 - $7,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-19%
Volume Reduction	Reduction in Vehicles per Day	-42%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

Advantages

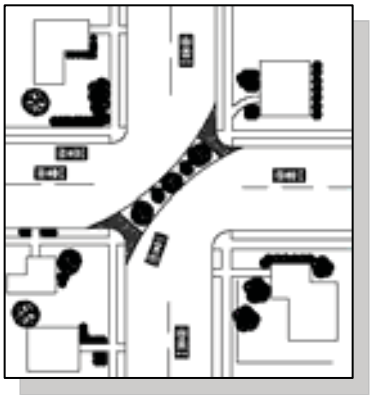
- Able to maintain two-way bicycle access
- Effective in reducing traffic volumes

Disadvantages

- Causes circuitous routes for local residents
- May limit access to businesses
- Drivers can bypass the barrier

Diagonal Diverter

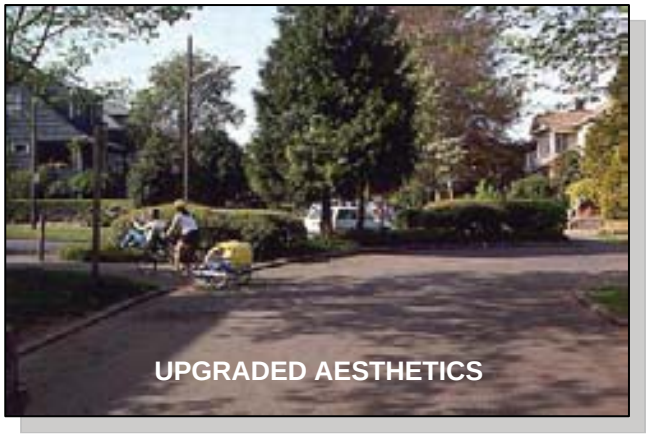
Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.



Approximate Cost: $20,000 - $25,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	-4%
Volume Reduction	Reduction in Vehicles per Day	-35%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

STANDARD TREATMENT
WITH MINOR LANDSCAPING TREATMENT



UPGRADED AESTHETICS

Advantages

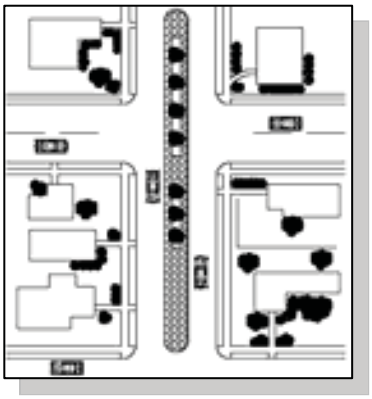
- Able to maintain full pedestrian and bicycle access
- Reduces traffic volumes

Disadvantages

- Causes circuitous routes for local residents
- Delays for emergency services
- May be expensive
- May require reconstruction of corner curbs

Median Barrier

Median barriers are raised islands that are located along the centerline of a street and continue through an intersection so as to block through (and left-turn) movement at a cross street.



Approximate Cost: $15,000 - $20,000 per 100 feet (dependent on length and width)

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D%
Volume Reduction	Reduction in Vehicles per Day	-31%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

STANDARD TREATMENT

UPGRADED AESTHETICS

Advantages

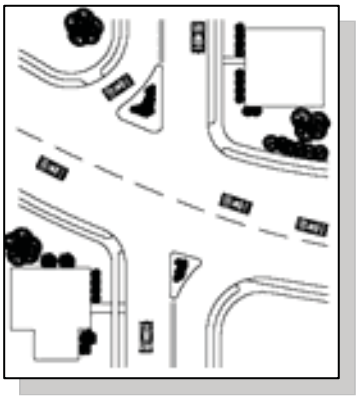
- Can improve safety at an intersection of a local street and a major street by prohibiting critical through or left-turn movements
- Can reduce traffic volumes on a cut-through route that crosses a major street

Disadvantages

- Requires available street width on the major street
- Limits turns to and from the side streets and driveways for local residents and emergency services

Forced-Turn Island

Forced turn islands are raised islands that prohibit certain movements on approaches to an intersection.



Approximate Cost: $3,000 - $5,000 per location

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D%
Volume Reduction	Reduction in Vehicles per Day	-31%
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect. Source: Traffic Calming: State of the Practice, 2000.		

Advantages

- Can improve safety at an intersection by prohibiting critical turning movements
- Reduces traffic volumes

Disadvantages

- If designed improperly, drivers can maneuver around the island to make an illegal movement
- May divert a traffic problem to a different street

Turn-Movement Restrictions

Turn movement restrictions involve the use of signs to prevent undesired turning movements without the use of physical devices. The restrictions may generally apply to turning movements in or out of a residential street to a larger street. The turn movement restrictions may be permanent or only during peak commute hours.

Measured Effectiveness		
Speed Reduction	Reduction in 85th Percentile Speeds between Slow Points	I/D
Volume Reduction	Reduction in Vehicles per Day	I/D
Safety Reduction	Reduction in Average Annual Number of Collisions	I/D
Note: I/D = Insufficient Data to predict reduction effect.		

Approximate Cost: $150 per sign (enforcement may be necessary to be effective)

Advantages

- Can reduce cut-through traffic at specific times of day
- Can increase safety at an intersection by prohibiting certain turning movements
- Low cost

Disadvantages

- Restrictions apply to resident and non-residents
- Requires enforcement during time of restriction to be effective
- May divert a traffic problem to another street

4. TOOLBOX GUIDELINES

This section provides guidance on selecting the most appropriate neighborhood traffic management measure for a specific problem. This involves narrowing the toolbox of neighborhood traffic management measures to those that will most closely target the key traffic issue; are appropriate for the type of location concerned; and are compatible with the traffic volumes, geometrics, and adjacent land uses near the given location. When the list has been narrowed, devices should be considered that are likely supported by affected residents. Finally, the selected devices need to be placed in a manner that will produce the desired results.

GUIDELINES

Traffic Related Concern

The first task when selecting the most appropriate traffic calming device is to narrow the field of devices to those that address the primary traffic concern. The most common traffic related concerns are:

- Speeding – motor vehicle speeds are too high
- Traffic Volumes – motor vehicle usage levels (all trips or non-local trips only) are too high
- Vehicle Safety – motor vehicle speeds or volumes create an inordinate level of risk

Each device in the toolbox is appropriate to a different subset of the above traffic-related concerns. Table 1 summarizes the appropriateness of each device.

Non-Physical Measures – The first solutions to consider should be Non-Physical Measures, such as signs and markings, since these can devices increase driver awareness and are relatively inexpensive.

Speed Control Measures

Speed control measures can address any of the major problem types:

- ***Narrowing Measures*** – Narrowing devices, such as neckdowns, center island narrowings, or chokers, are less obtrusive than other devices and can be more aesthetically pleasing if residents opt to fund upgraded landscaping.
- ***Horizontal Measures*** – Horizontal deflection devices, such as chicanes and traffic circles, are more intrusive but also more effective than narrowings because they force vehicles to navigate horizontally around physical objects. Residents can also elect to fund upgraded landscaping.
- ***Vertical Measures*** – Vertical deflection devices provide the greatest speed reduction, and consequently have the greatest potential to slow emergency response vehicles, buses, and trucks. Therefore, the placement of these devices should be carefully considered, especially to limit any potential impact on emergency vehicles or transit access.

Volume Control Measures

If speed-control measures fail to produce desired results, then diversion measures, such as street closures or forced turns may be considered. These devices redirect traffic to an adjacent street, and, therefore, should be considered after all other measures fail to produce the desired results. Volume control measures limit through

traffic or turning movements at specific locations for both residents and non-residents. The full effect of the traffic diversion should be investigated before device implementation.

Location Type

The appropriate device for a given problem is a function of the location (midblock or at an intersection). Special consideration should be given to streets used by the Fire Department as primary response routes when responding to emergencies.

Table 2 indicates the location(s) where each type of traffic calming measure is applicable.

Street Classification, Location, and Other Constraints

The third step in determining the most appropriate device is to consider how each device is compatible with the street classification, traffic volumes, posted speeds, and special roadway users. Table 3 illustrates where each device is appropriate with certain constraints.

TABLE 1
APPLICABILITY OF TREATMENTS BY TRAFFIC RELATED CONCERN

Types of Measures		Type of Traffic Related Concern				
		Speeding	**Traffic Volume**	**Vehicle Collisions**	**Pedestrian Safety**	**Noise**
Non-Physical Control Measures						
	Targeted Speed Enforcement	●	○	◒	◒	◒
	Speed Radar Trailer	●	○	○	○	◒
	Speed Feedback Sign	●	○	○	○	◒
	Centerline/Edgeline Lane Striping	●	○	○	○	○
	Optical Speed Bars	◒	○	○	○	○
	Signage	●	◒	◒	○	○
	Speed Legend	●	○	○	○	○
	Centerline Botts Dots	○	○	●	◒	○
	High Visibility Cross Walks	◒	○	○	●	○
	Angled Parking	●	◒	○	○	○
Speed Control – Narrowing Measures						
	Neckdown/Bulbout	●	◒	○	●	○
	Center Island Narrowing/ Pedestrian Refuge	●	◒	◒	●	○
	Two-Lane Choker	●	◒	○	○	○
	One-Lane Choker	●	◒	○	○	○
Speed Control - Horizontal Measures						
	Traffic Circle	●	◒	●	◒	○
	Roundabout (Single-Lane)	◒	◒	●	○	●
	Chicane	●	◒	○	○	○
	Lateral Shift	◒	◒	○	○	○
	Realigned Intersection	◒	◒	●	○	○
Speed Control – Vertical Measures						
	Speed Hump	●	●	◒	◒	×
	Speed Lump	●	●	◒	◒	×
	Speed Cushion	●	●	◒	◒	×
	Speed Table	●	◒	◒	◒	×
	Raised Crosswalk	●	◒	◒	●	×
	Raised Intersection	●	◒	◒	●	×
	Textured Pavement	◒	○	○	◒	×
	Rumble Strips	◒	○	○	○	×
Volume Control Measures						
	Full Closure	●	●	○	○	○
	Partial Closure	●	●	○	○	○
	Diagonal Diverter	●	●	○	○	○
	Median Barrier	○	●	◒	○	○
	Forced Turn Island	○	●	◒	○	○
Key:	● = Strongly Appropriate ◒ = Moderately Appropriate		× = Inappropriate/Counterproductive ○ = Indifferent			

TABLE 2
APPLICABILITY OF TREATMENTS BY LOCATION

Type of Measure	Mid-Block	Intersection	Study Perimeter	Collectors*	Transit Routes
Non-Physical Control Measures					
Targeted Speed Enforcement	●	●	●	●	●
Radar Trailer	●	●	●	●	●
Speed Feedback Sign	●	●	●	●	●
Centerline/Edgeline Lane Striping	●	×	×	●	●
Optical Speed Bars	●	×	×	●	●
Signage	●	●	●	●	●
Speed Legend	●	●	●	●	●
Centerline Botts Dots	**On Curves**	×	×	●	●
High Visibility Crosswalks	●	**Unsignalized Intersections**	**Unsignalized Intersections**	●	●
Angled Parking	●	×	×	●	○
Speed Control – Narrowing Measures					
Neckdown/Bulbout	×	●	●	●	●
Center Island Narrowing/ Pedestrian Refuge	●	●	●	●	●
Two-Lane Choker	●	×	×	×	●
One-Lane Choker	●	×	×	×	×
Speed Control – Horizontal Measures					
Traffic Circle	×	●	○	●	●
Roundabout (Single-Lane)	×	○	○	●	●
Chicane	●	×	×	●	●
Lateral Shift	●	×	×	●	●
Realigned Intersection	×	**Unsignalized Intersections**	**Unsignalized Intersections**	●	●
Speed Control – Vertical Measures					
Speed Hump	●	×	×	×	×
Speed Lump	●	×	×	○	●
Speed Cushion	●	×	×	○	●
Speed Table	●	×	×	○	○
Raised Crosswalk	●	○	○	○	○
Raised Intersection	×	●	●	○	○
Textured Pavement	●	●	●	●	●
Rumble Strips	●	●	○	●	●
Volume Control Measures					
Full Closure	×	●	●	×	×
Partial Closure	×	●	●	●	●
Diagonal Diverter	×	●	×	×	×
Median Barrier	×	○	●	×	×
Forced Turn Island	×	○	●	○	○

Key: * Due to Emergency Response Concerns

× = Never applicable. ○ = Seldom, except in some cases. ● = Generally applicable.

TABLE 3
APPLICABILITY BY STREET TYPE

Types of Measures	Roadway Classification		
	Local	Collector	Other Considerations
Non-Physical Control Measures			
Targeted Speed Enforcement	No Limitations with respect to ADT or Speed		None
Radar Trailer			
Speed Feedback Sign	No		
Centerline/Edgeline Lane Striping			
Optical Speed Bars			
Signage			
Speed Legend			
Centerline Botts Dots			Not applicable on snow removal routes above 2,000 feet
High Visibility Crosswalks			None
Angled Parking	ADT <4,000; Width ≥48 feet: Speed Limit ≤30 mph		
Speed Control – Narrowing Measures			
Neckdown/Bulbout	ADT ≤ 20,000; Speed Limit ≤ 35		Not applicable on snow removal routes above 2,000 feet
Center Island Narrowing/ Pedestrian Refuge			
Two-Lane Choker			Requires provisions on snow removal routes
One-Lane Choker	ADT ≤ 3,000; Speed Limit ≤ 30	No	DPW must review sight distance. Not applicable on snow removal routes above 2,000 feet
Speed Control – Horizontal Measures			
Traffic Circle	Daily Entering Volume <10,000; Speed Limit ≤ 35 mph		Grades ≤ 4% Requires provisions on snow removal routes
Roundabout (Single-Lane)	No	Daily Entering Volume <16,000; Speed Limit ≤ 45 mph	
Chicane	No	ADT ≤ 5,000; Speed Limit ≤ 35	• Grades ≤ 8% • Requires provisions on snow removal routes
Lateral Shift	No	ADT ≤ 20,000; Speed Limit ≤ 35	Not applicable on snow removal routes above 2,000 feet
Realigned Intersection	Daily Entering Volume <5,000; Speed Limit ≤ 35 mph		Requires provisions on snow removal routes
Speed Control – Vertical Measures			
Speed Hump	ADT<3,000; Speed Limit ≤ 30mph		• Grades ≤ 8% • Not applicable on snow removal routes above 2,000 feet
Speed Lump			
Speed Cushion			
Speed Table [1]	ADT<7,500: Speed Limit >25 mph and ≤ 35 mph		
Raised Crosswalk			
Raised Intersection	No		
Textured Pavement [2]	No	Yes	Noise impact to adjacent residential units
Rumble Strips [2]	Yes	Yes	Noise impact to adjacent residential units

Notes: [1] Not appropriate for streets without curbs, gutter, or sidewalks.
[2] Use of this device should be limited to locations where noise impacts would be minimal.

Table 3 (continued) Applicability by Street Type			
Types of Measures	**Roadway Classification**		
	Local	**Collector**	**Other Considerations**
Volume Control Measures			
Full Closure	≥ 25% non-local traffic. Evaluation should be conducted to determine effects of diverted traffic to alternate routes	No	Requires provisions on snow removal routes
Partial Closure			Not applicable on snow removal routes above 2,000 feet
Diagonal Diverter			
Median Barrier			
Forced Turn Island			

EFFECTIVENESS COMPARISON

When more than one traffic calming device is available, it is helpful to understand the levels of effectiveness for each device to better determine which device will have the greatest effect in meeting the specified objective(s). Table 4 summarizes the effectiveness data (including excluded devices) that has been compiled for each of the neighborhood traffic management measures in the toolbox. These data are averages and the actual effectiveness will vary based on site-specific circumstances, such as proximity to major roads and the availability of alternate routes.

PLACING THE NEIGHBORHOOD TRAFFIC MANAGEMENT MEASURES

Strategies for the specific placement of devices differ depending on whether the concern is speed-control, volume-control, or safety related. The placement of devices is described below.

Placing Speed-Control Measures

Where feasible, neighborhood traffic management measures should be spaced in such a way to achieve the following two design speeds:

- **Slow-Point 85th Percentile Design Speed**: the speed that 85 percent of vehicles are traveling less than, when they are crossing a neighborhood traffic management device; the target slow-point speed is defined as 5 mph below the posted speed limit.

- **Midpoint 85th Percentile Design Speed**: the speed that 85 percent of vehicles are traveling less than, when they are halfway between a traffic calming device or other roadway feature that requires significant slowing (e.g., stop sign or curve). The target midpoint speed is defined as 5 mph above the posted speed limit.

Figure 3 illustrates how to estimate the midpoint speed.

TABLE 4
QUANTITATIVE IMPACTS OF NEIGHBORHOOD TRAFFIC MANAGEMENT MEASURES

Types of Measures		Effectiveness									
		85th Percentile Change				Vehicles Per Day		Average Annual Collisions			
		Before	After	Change	Percent Change	Change	Percent Change	Before	After	Change	Percent Change
Non-Physical Measures											
	All Non-Physical Measures	Limited Effectiveness as stand alone device									
Speed Control – Vertical Measures											
	Entry Feature	I/D				I/D		I/D			
	Speed Hump	35.0	27.4	-7.6	-22%	-355	-18%	2.62	2.29	-0.33	-13%
	Speed Lump	Comparable to speed hump but I/D									
	Speed Cushion[1]	Comparable to speed hump but I/D			-14%	Comparable to speed hump but I/D					
	Split Speed Hump	37	32	-5	-14%	I/D		I/D			
	Speed Table	36.7	30.1	-6.6	-18%	-415	-12%	6.71	3.66	-3.05	-45%
	Raised Crosswalk										
	Raised Intersection	34.6	34.3	-0.3	-1%	Ineffective					
	Rumble Strips	I/D and Limited Effectiveness									
	Textured Pavement	Limited Effectiveness as stand alone device									
Speed Control – Narrowing Measures											
	Neckdown/Bulbout	34.9	32.3	-2.6	-7%	-293	-10%	I/D			
	Center Island Narrowing										
	Two-Lane Choker										
	One-Lane Choker	I/D			-14%	I/D	-20%				
Speed Control – Horizontal Measures											
	Traffic Circle	34.2	30.3	-3.9	-11%	-293	-5%	2.19	0.64	-1.55	-71%
	Roundabout (Single-Lane)	Insignificant Speed Effects				Insignificant Volume Effects		Not Recorded			-15% to -33%
	Chicane	I/D and Limited Effectiveness									
	Lateral Shift	Ineffective									
	Realigned Intersection	I/D				I/D		I/D			
Volume Control Measures											
	Full Closure	I/D	I/D	I/D	I/D	-671	-44%	I/D			
	Partial Closure	32.3	26.3	-6.0	-19%	-1,611	-42%	I/D			
	Diagonal Diverter	29.3	27.9	-1.4	-4%	-501	-35%	I/D			
	Median Barrier	I/D				I/D		I/D			
	Forced Turn Island										
	Turn-Movement Restrictions										
Stop Signs											
	Stop Signs	I/D				I/D		I/D			

Notes: I/D = Insufficient Data
Source: Traffic Calming State-of-the Practice (Ewing, 1999)
[1]City of Portland, Rubber Speed Bump Research, 1995

Figure 3 Estimating Midpoint Speed

In mathematical terms, the following exponential function gives the relationship between midpoint speed and spacing of slow points:

$$85^{th}_{midpoint\ (mph)} = 85^{th}_{slow\ point\ (mph)} + (85^{th}_{street\ (mph)} - 85^{th}_{slow\ point\ (mph)}) * 0.56 * (1 - e^{-0.004 * spacing\ (ft.)})$$

where;

$85^{th}_{midpoint}$ = resulting 85^{th} percentile speed at midpoint after treatment;
$85^{th}_{slow\ point}$ = estimated 85^{th} percentile speed at the slow point after treatment;
85^{th}_{street} = 85^{th} percentile speed of street before treatment;
spacing = distance in feet between two devices.

When placing speed-control measures, use the above formula to test proposed spacings to determine whether the estimated midpoint speeds would meet the targeted midpoint speed.

Example (speed humps on street with starting speed of 32 mph):

Where spacing is 350 feet:

$$85^{th}_{midpoint\ (mph)} = 15\ mph + ((32\ mph - 15\ mph) * 0.56 * (1 - e^{-0.004 *} 350\ feet))$$

$$85^{th}_{midpoint\ (mph)} = \underline{22\ mph}$$

Where spacing is 750 feet:

$$85^{th}_{midpoint\ (mph)} = 15\ mph + ((32\ mph - 15\ mph) * 0.56 * (1 - e^{-0.004 *} 750\ feet))$$

$$85^{th}_{midpoint\ (mph)} = \underline{24\ mph}$$

The spacing of neighborhood traffic management measures directly affects the midpoint speeds: the farther apart they are, the higher the midpoint speed. In general, speed control measures placed 350 to 750 feet from another slow-point can result in speed reductions similar to those indicated in Table 4. Measures placed at intervals of less that 350 feet can become a nuisance to drivers, and measures placed greater than 750 feet apart decrease the ability to slow speeds to the target midpoint speed. In addition, vertical measures should be place a minimum of 250 feet from an adjacent intersection.

Placing Volume-Control Measures

Neighborhood traffic management devices intended to divert traffic can be located either external or internal to the neighborhood.

- Gateway Measures – Volume-control measures placed at entrances or gateways to neighborhoods can be more effective in reducing volumes because drivers encounter these devices upon entering a neighborhood, which may deter future use. However, these measures can also cause local traffic to take more circuitous paths than internal measures would.

- Internal Measures – When placed within a neighborhood, measures have a less direct effect on non-local traffic. First-time attempts to travel through the neighborhood will occur more frequently, and drivers will seek alternative routes within the neighborhood. However, this type of placement can cause less of an inconvenience to local traffic.

Placing Safety Measures

The placement of safety-oriented neighborhood traffic management devices is dependent on the particulars of the traffic-related concern and on the characteristics of the selected neighborhood traffic management device. For example, if the traffic related concern involves pedestrian safety, then the solution—a raised crosswalk, for example—should be placed at a location where it is likely to be heavily used by pedestrians.

PART III – TRAFFIC MANAGEMENT STRATEGIES

This section of the NTMP policy manual describes the strategies and intent of typical traffic control devices and the different levels of neighborhood traffic calming measures used by the City. This section explains the use of stop signs and pavement markings and discusses the potential removal of unwarranted traffic control devices. For traffic calming measures addressing speed and traffic volumes, an explanation of the expected effectiveness and performance measures is discussed. There are two primary types of traffic management strategies: non-physical and physical measures.

Non-Physical Traffic Management Strategies

Non-physical strategies provide a non-invasive form of calming traffic that is inexpensive and easy to implement, and that can also be removed easily if the measure is unsuccessful. For these reasons, non-physical measures will be applied prior to implementing any physical traffic calming measures. Non-physical traffic calming strategies can take multiple forms. A discussion of some of the most common non-physical strategies is provided below.

- **Safety Education and Community Involvement** involves efforts to make the public mindful of their own driving behavior and the impact it has on others. Programs are often centered on promoting safe and lawful driving habits and may include programs geared toward drivers, bicyclists, pedestrians, or safe interaction amongst all users. Public meetings can provide a means for communicating concerns to City staff while allowing residents to share views and form consensus.
- **Police Enforcement** involves the presence of police officers to monitor speeds and issue citations for law violations such as stop sign, speed limit, turn restriction, and other traffic law violations. Visible presence is highly effective while an officer is present. Police enforcement can be useful for implementation of a new traffic calming measure, as well as provide a visible reminder of existing measures.
- **Pavement Markings** include a variety of painted roadway guidance such as various forms of striping and painted markings and raised pavement markers. Painted striping and raised pavement markers are used to reduce travel lane widths, making drivers feel more restricted and thereby reducing their speeds. Striping is also used to create higher visibility for pedestrians at crosswalks and separate bike traffic from vehicle traffic. Painted markings are associated with reminding drivers of regulations such as speed limits, appropriate turn movements, or shared-use facilities. Painted markings and pavement markers may also be used to provide added visibility. Pavement markings are relatively easy and low-cost to install, maintain, and modify. Markings can reduce speeds, prevent unwanted turn movements, and heighten driver awareness.
- **Signage** may be used for a variety of warnings, regulations, and restrictions. Regulatory signs, such as speed limit signs, are a useful way to remind drivers of the regulatory speed limit in their neighborhood. Signed turn restrictions may be installed to prohibit certain movements at an intersection at certain times of day in cases where cut-through traffic is common. Signage may also be added to restrict certain types of vehicles on neighborhood streets. While tools like radar speed units are indeed physical devices placed along the road, they are included in the non-physical category because they do not physically slow or divert traffic by causing vehicles to have to drive over or around them. Signage can reduce or restrict unwanted traffic and provide clear definitions of legal speed limits or provide other warnings and reminders. Signage is not self-enforcing and may decrease the aesthetics of a neighborhood or increase traffic on unintended streets.

  Note that stop signs are not included as a traffic calming strategy in this manual as they are not intended as a traffic calming device. Stop signs are intended to assign right-of-way at intersections. Guidance for their placement is included in the Manual on Uniform Traffic Control Devices. Multi-way stop control should not be installed at an intersection as a speed control measure; studies have shown that stop signs are ineffective for this purpose. Furthermore, unwarranted multi-way stops illicit poor compliance from drivers and create a lack of respect for stop signs in general. Unwarranted stops increase accidents and

diminish safety, especially for pedestrians and children, and they increase noise and pollution fro vehicles stopped at the intersection.

Physical Traffic Management Strategies

Physical strategies consist of physical changes in the roadway design for the purpose of reducing the average roadway speed (speed management) or daily traffic volume (volume management), improving the vehicle-pedestrian design, or a combination of these elements. Physical strategies may be considered in instances where non-physical strategies have first been implemented, evaluated, and found to be unsuccessful. Physical strategies are discussed below.

- **Speed Management** can be achieved through either horizontal or vertical measures. Horizontal speed management strategies include treatments that create physical horizontal deviations or deflections in the roadway with the purpose of influencing driver behavior by physically changing the driver's path. Examples of horizontal speed strategies include traffic circles, roundabouts, and lateral shifts. Vertical speed management strategies refer to physical treatments that involve vertical displacement to influence speed through ride discomfort. Examples of vertical speed strategies include speed humps, raised crosswalks, and rumble strips.

  Physical speed management strategies offer the benefit of self-enforcing speed limits and enhancing pedestrian safety. Additionally, horizontal speed strategies can often be designed to add aesthetic value to neighborhoods. Some concerns of physical speed management strategies include the higher cost compared to non-physical measures, emergency service limitations, increased noise and air pollution for some strategies, and difficulty of removal if they prove ineffective.

- **Traffic Volume Management** strategies include treatments that are intended to reduce and redirect traffic movements but are unlikely to have a significant influence on operating speeds. Examples of traffic volume management strategies include closures, diagonal diverters, and forced turn islands. Traffic volume strategies are effective at reducing or eliminating cut-through traffic and can often reduce speeds as well. The main concerns of traffic volume management strategies are their cost, additional delays for emergency vehicles and local residents, and the potential for diverting cut-through traffic to adjacent streets.

- **Removal of an Unwarranted Traffic Control Device** is sometimes needed to improve traffic management. The overuse of traffic control devices, particularly stop signs, can desensitize drivers and lead to noncompliance. Unwarranted stop signs may actually lead to increased speeding as drivers try to make up the lost time. The added delay also unnecessarily increases vehicle emissions, fuel consumption, operating cost, and noise. Excessive stops signs may cause drivers to divert to other neighborhood streets. Sometimes, the need for stop signs can be eliminated by removing obstructions and improving sight distance. The MUTCD explicitly states that stops signs should not be used for speed control. If the total bicycle, pedestrian, and vehicular traffic entering an intersection from all approaches is less than 2,000 vehicles per day, a four-way stop may not be warranted. When determined through engineering study, four-way-stop controlled intersections may be converted to two-way stops.

Performance and Cost Measures

Exhibit 3 summarizes the toolbox of available traffic calming devices and their effectiveness at addressing specific concerns. More detailed information is provided in PART IV – NEIGHBORHOOD TRAFFIC CALMING MEASURES TOOLBOX. For each of the physical and non-physical traffic calming devices eight performance measures were assessed. Each of the following eight performance measures were rated very good, good, fair, poor, or not applicable:

- Speed
- Volume
- Cut-through
- Crashes

- Emergency vehicles
- Pedestrian
- Bicycle
- Noise

The likely capital cost was determined for each traffic control device, and a range of costs in 2012 dollars was provided. The ultimate cost of any improvement may vary substantially based on the number of devices implemented, the length of the improvement, or the extent of necessary reconstruction. It is not the intent of this manual to determine detailed costs, but rather to provide generalized costs for comparison between devices. Costs were categorized as follows:

- $ = $0 to $25,000
- $$= $25,000 to $50,000
- $$$ = $50,000 to $100,000
- $$$$ = $100,000+

EXHIBIT 3

Toolbox Summary

See detailed device pages for more information

Very Good · Good · Fair · Poor · (N/A) Not Applicable

Effectiveness of traffic control measure at addressing concern

Traffic Management Strategy	Speed (SPEED LIMIT 25)	Volume	Cut Through	Crashes	Emergency Vehicle	Pedestrian	Bicycle	Noise	Cost ($)
Non-Physical Control Measures									
Targeted Police Enforcement	Very Good	Poor	Fair	Fair	Very Good	Very Good	Very Good	N/A	$$
Radar Speed Trailer	Good	Poor	Poor	N/A	Very Good	Very Good	Very Good	N/A	$$
Permanent Radar Speed Sign	Good	Poor	Poor	N/A	Very Good	Very Good	Very Good	N/A	$$
Centerline / Edgeline / Laneline Striping	Fair	Fair	Poor	N/A	Very Good	Very Good	Very Good	N/A	$
Speed Reduction Markings	Fair	Poor	Poor	N/A	Very Good	Very Good	Very Good	N/A	$
Speed Limit Signage	Fair	Poor	Poor	Fair	Very Good	Very Good	Very Good	N/A	$
Speed Limit Pavement Markings	Fair	Poor	Poor	N/A	Very Good	Very Good	Very Good	N/A	$
Raised Pavement Markers	Fair	Poor	Poor	Fair	Very Good	Very Good	Fair	Poor	$$
High Visibility Crosswalks	Fair	Poor	Poor	Good	Very Good	Very Good	Good	N/A	$$
Parking Strategies	Fair	Fair	Fair	Fair	Fair	Good	Fair	N/A	$$
Education and Community Involvement	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	$
Signed Turn Restriction	Poor	Good	Good	N/A	Very Good	Very Good	Very Good	N/A	$
Speed Control - Narrowing Measures									
Neckdowns and Bulbouts	Good	Fair	Fair	Fair	Fair	Good	Fair	N/A	$$
Lane Narrowing with Center Island /Pededstrian Refuge	Fair	Poor	Fair	Fair	Good	Good	Fair	N/A	$$$
Two-Lane Choker	Fair	Fair	Fair	Fair	Good	N/A	Fair	N/A	$$$
One-Lane Choker	Very Good	Very Good	Very Good	Poor	Poor	Poor	Poor	N/A	$$$
Roadside and Median Landscaping	Fair	N/A	N/A	N/A	N/A	Fair	Fair	N/A	$$$
Road Narrowing / Detached Sidewalks	Good	N/A	N/A	N/A	Good	Very Good	Fair	N/A	$$$
Speed Control - Horizontal Measures									
Traffic Circle	Very Good	Fair	Fair	Good	Fair	Fair	Fair	Fair	$$$
Roundabout (Single Lane)	Good	N/A	Poor	Very Good	Fair	Good	Fair	Good	$$$$
Chicane	Good	Poor	Fair	N/A	Good	Good	Fair	Fair	$$$
Lateral Shift	Fair	N/A	Fair	N/A	Good	Fair	Fair	N/A	$$$
Realigned Intersection	Good	Fair	Fair	N/A	Good	N/A	N/A	N/A	$$$
Medians and Partial Medians	Fair	Fair	Poor	Fair	Fair	Fair	Fair	N/A	$$$
Speed Control - Vertical Measures									
Speed Hump	Very Good	Good	Good	Fair	Poor	Good	Good	Poor	$
Speed Table	Very Good	Good	Good	Fair	Poor	Good	Good	Poor	$
Speed Kidneys	Very Good	Good	Good	Fair	Good	Good	Good	Fair	$
Raised Crosswalk	Good	Good	Good	Fair	Poor	Very Good	Good	Poor	$
Raised Intersection	Good	N/A	N/A	Fair	Poor	Very Good	Good	N/A	$$$
Volume Control Measures									
Full Closure (gate, midblock cul-de-sac, intersection cul-de-sac)	Good	Fair	Very Good	Fair	Poor	Good	Good	Good	$$$$
Partial Closure	Good	Fair	Very Good	Fair	Fair	Good	Good	Good	$$$$
Diagonal Diverter	Good	Fair	Very Good	Fair	Fair	Good	Good	Good	$$$$
Median Barrier	Fair	Fair	Very Good	Good	Fair	Good	Good	Good	$$$$
Forced Turn Island	Fair	Fair	Very Good	Good	Fair	Good	Good	Good	$$$
Two-Way Street Conversions	Good	Fair	Fair	Fair	Good	Good	Good	N/A	$$$$
One-Way Couplet Conversions	Poor	Good	Fair	Good	Fair	Good	Good	N/A	$$$

PART IV – NEIGHBORHOOD TRAFFIC CALMING MEASUR TOOLBOX

This section of the manual provides a detailed toolbox of traffic calming measures for use in developing neighborhood traffic calming plans. Each measure includes a brief description, noted positive and negative aspects, and an accompanying illustration or photograph. In selecting the correct set of tools to address an identified and documented problem, it is important to understand these considerations, as well as the initial and long-term costs associated with each tool. The individual devices are grouped so that the reader can compare and identify those measures that best address the traffic issues and are most appropriate for the specific neighborhood.

The toolbox is divided into three categories:

1. **Non-Physical Measures**
2. **Speed Management Traffic Calming Measures**
3. **Traffic Volume Management Traffic Calming Measures**

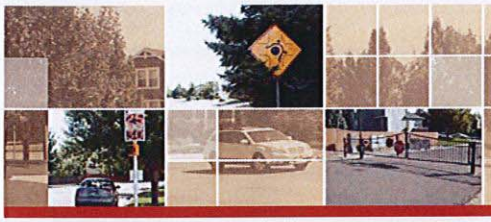
This NTMP manual consists of nearly 40 potential devices to address neighborhood traffic management concerns and each device is described in detail in the following pages of this manual.

Parts V and VI of this manual include application forms for initiating a request for neighborhood traffic calming, as well as a neighborhood sign-up sheet for signatures.

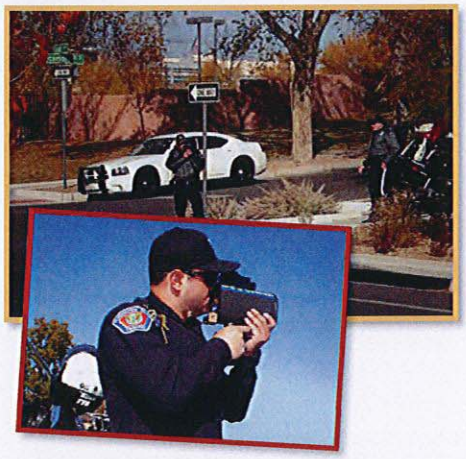
Part VII of this manual presents the current City of Albuquerque street functional classification map. This map indicates those roadways that are classified as locals or collectors which are eligible for traffic calming.

Part VIII of this manual presents the current City of Albuquerque emergency response routes map. This map indicates which streets are heavily utilized by emergency responders and are therefore eligible only for those traffic calming devices that are non-physical or that do not impede emergency response vehicles.

A glossary of terms, references, and the acknowledgments sections are provided at the end of this manual.



Targ Police Enforcement



DESCRIPTION:

Targeted police enforcement is the deployment of officers to specific streets or neighborhoods for a period of time to conduct radar speed enforcement and enforcement of traffic laws. The presence and actions of police has the immediate effect of reducing speeding, aggressive driving, stop sign violations, turn-restriction violations, and other traffic law violations but is likely not long term unless a sustained effort occurs.

APPLICATION:

On neighborhood streets where speeding, other traffic law violations, and/or related crashes have been documented, the City of Albuquerque, Traffic Engineering Division may respond by submitting a request to the Albuquerque Police Department Metro Traffic Division for focused enforcement at the specified locations. Because APD resources are limited, the duration of the targeted enforcement may be for a limited time. Targeted enforcement may also be requested in conjunction with new neighborhood traffic-management strategies to help drivers become aware of new restrictions or measures, such as turn prohibitions. The level of deployment can vary from one motor unit officer for a low-volume street to a team of patrol units at higher-volume locations.

Repeated short-term deployments over a longer term may be more cost-effective and results in a greater effect than one longer deployment (for example, eight 1 hour periods scattered over a few weeks rather than one 8 hour day). If regular drivers on a street see police enforcement at different times at the same location, they may be conditioned to anticipate enforcement in the future. If a radar speed trailer is deployed placing a police unit beyond a radar speed trailer, this may cause motorists to associate enforcement actions with the trailer, resulting in greater effectiveness of the radar speed trailer at a location.

Advantages

- Highly effective in reducing speeding and other traffic law violations including stop sign running and illegal turns.
- Can be deployed on short notice and for the specific hours for which problems have been identified.
- Results are immediate.
- Can reduce crashes related to speeding and other violations.
- Low cost if used temporarily.
- Does not affect emergency vehicles.
- Targets violators without affecting normal traffic.
- Where neighborhood traffic-management measures have been recently deployed, the officers can issue warnings or citations at their discretion. This can promote public education regarding the new devices or restrictions.

Disadvantages

- Effectiveness may be temporary, especially if the enforcement is deployed only once.
- Enforcement is limited to APD availability.

Effectiveness Scorecard

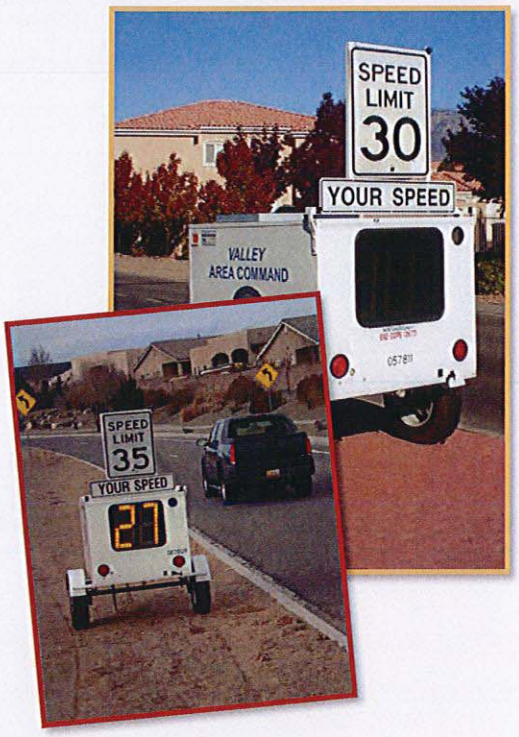
Speed	●
Volume	◕
Cut-through	◑
Crashes	◑
Emergency Vehicle	●
Pedestrian	●
Bicycle	●
Noise	N/A
Cost	$$

● Very Good ◕ Good ◑ Fair ◔ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Radar Speed Trailer



DESCRIPTION:

Radar speed trailers are mobile units placed on the side of the road that use radar to sense an oncoming vehicle's speed and display that speed back to the approaching driver. This is intended to give the driver an external visual indication of their speed, which if excessive, may remind them to slow down. The radar speed trailers have no cameras and do not take any photos of offending drivers for enforcement purposes.

APPLICATION:

The Albuquerque Police Department (APD) maintains a fleet of radar speed trailers, distributed among the several area commands. The Metro Traffic Division also maintains radar speed trailers.

On neighborhood streets where speeding has been documented, the City of Albuquerque, Traffic Engineering Division may respond by submitting a request to APD for deployment of a radar speed trailer(s) at the specified locations. Because these APD resources are limited, the number and duration of the trailer deployment may be limited.

Radar speed trailers must be deployed on the side of the road where they will be safe from traffic, not block sidewalks or bicycle lanes, and not obstruct sight distance at intersections and driveways. The radar speed trailers must also be positioned so that they are not blocked by parked vehicles.

Advantages

- Have been shown to be effective in prompting some speeding drivers to slow down.
- Can be deployed on short notice and easily moved.
- Results are immediate.
- Deployment is low cost.
- Does not slow emergency vehicles.
- Alerts violators without affecting normal traffic.

Disadvantages

- Effectiveness may be temporary once removed.
- Limited to APD availability.
- Requires enough space to set up, and may reduce available parking.
- Units are subject to vandalism.
- Some drivers may try to register a high speed.

Effectiveness Scorecard

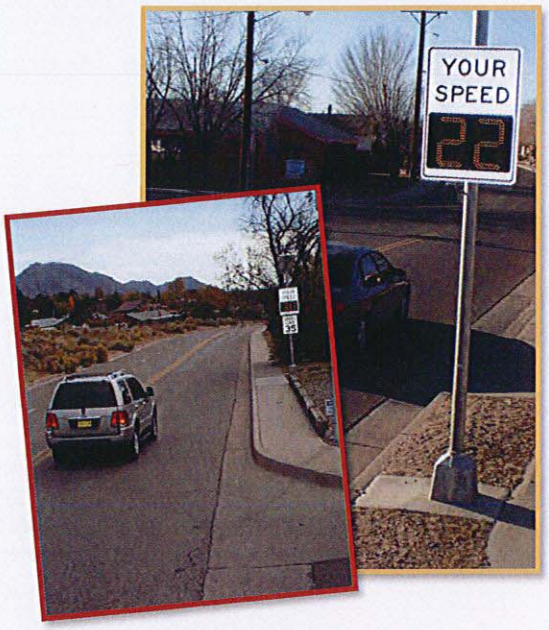
Speed	Very Good
Volume	Poor
Cut-through	Poor
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Permanent R
Speed Sign



DESCRIPTION:

Permanent radar speed signs, also called driver feedback signs, are post-mounted signs installed on the side of the road that use radar to sense an oncoming vehicle's speed and display that speed back to the approaching driver. They are usually installed with a regulatory speed limit sign on the same post. This is intended to give the driver an external visual indication of their speed, which if excessive, may remind them to slow down. The radar speed signs have no cameras and do not take any photos of offending drivers for enforcement purposes.

APPLICATION:

On neighborhood local or collector streets where a problem of speeding traffic has been documented, radar speed signs may be installed to help reduce traffic speeds. A location must be selected where there is enough room within the City right-of-way to install the radar speed sign so that it is visible for enough distance to be effective. City of Albuquerque standards are used for the construction of the concrete foundation and pole. The radar speed signs are available from a number of manufacturers. The signs can be hard-wired for electrical power where service is available, or they may include a photovoltaic panel for solar electric power. Some radar speed signs are available with the ability to record traffic-speed data for later download and analysis. Drivers may not understand the difference between the two units, and assume that the radar speed trailers may issue them an automated citation. This misunderstanding may lead to increased effectiveness of the radar speed trailers.

Advantages

- The visual reminder of drivers' speeds has been shown to be effective in prompting some speeding drivers to slow down.
- Radar speed signs do not slow emergency vehicles.
- Radar speed signs alert violators without affecting normal traffic.
- Can be implemented with metered electric service or solar powered.

Disadvantages

- Effectiveness may reduce over time as regular drivers become desensitized.
- Some drivers may ignore, knowing that the radar speed signs do not include automated enforcement.
- Some drivers may try to register a high speed.
- Units and solar panels are subject to vandalism and theft.

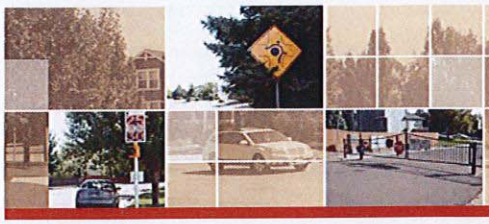
Effectiveness Scorecard

Speed	Very Good
Volume	Poor
Cut-through	Poor
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$$

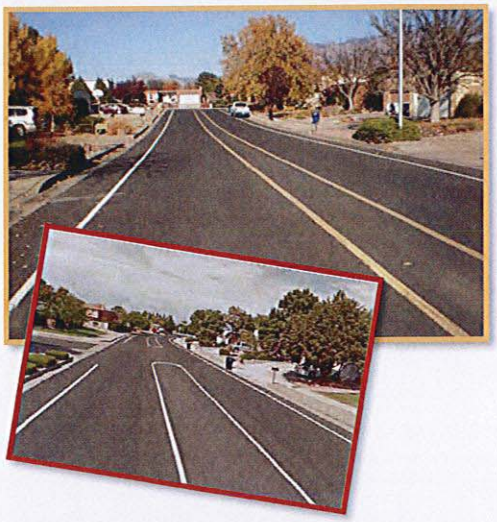
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25



Centerline / Edge L
Lane Line Striping



DESCRIPTION:

While most local neighborhood streets exist without any traffic striping, centerline, edge line, and lane line striping can be used to create designated travel lanes, bicycle lanes, parking lanes, and/or medians. As a neighborhood traffic calming measure, striping is positioned to reduce travel lane widths, making drivers feel more restricted and thereby inducing them to lower their speeds.

APPLICATION:

On neighborhood local or collector streets where a problem of speeding traffic has been documented, traffic stripes may be painted where there was previously none, or existing stripes may be removed and new stripes painted in the new desired configuration. This installation is most suited to long, straight, and wide streets where drivers feel unconstrained and speeds are high. On curvilinear streets, striping can reinforce lane designations, causing drivers to slow in order to maintain their travel within their lane. Centerlines, edge lines, and lane line markings should be installed according to the guidance provided in Chapter 3: Markings of the MUTCD.

The City standard lane width is 12 feet wide. Travel lanes may be reduced to 11 feet to provide more of the street for bicycles and/or parking. Reduction of the travel lanes to the minimum 10 foot width may be considered in special cases.

Caution should be used in applying centerline striping alone, as it may give drivers a sense of ownership of their half of the road and thereby increase speeding. A better treatment may be to provide edge lines with no centerline, indicating to drivers that they must share the two-way space with all traffic.

Advantages

- Striping is relatively easy and low-cost to install and modify.
- Traffic striping does not slow emergency vehicles.

Disadvantages

- Regular maintenance is required. Stripes must be repainted approximately every 4 years.
- Removal of pre-existing traffic stripes or of recent striping in order to change the configuration may leave unsightly scars on the pavement surface.
- Effectiveness may be low.

Effectiveness Scorecard

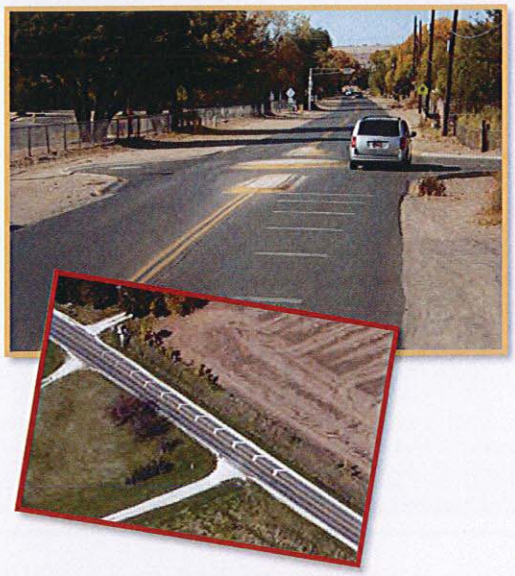
Speed	Fair
Volume	Fair
Cut-through	Poor
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

S Reduction Markings



DESCRIPTION:

Speed reduction markings are a series of various shapes of transverse pavement markings set at progressively reduced spacing, intended to enhance the driver's perception of speed. Essentially, gradually decreasing distance between markings gives the driver the illusion of traveling faster than they actually are and thus ideally causing them to slow down. Such markings are most appropriate for unexpected curves and may be short transverse markings placed along each edge of the lane, as described in MUTCD Section 3B.22. Transverse markings are placed within the lane, as described in MUTCD Section 3B.26 as advance speed hump markings. Both these types of markings are also called Optical Speed Bars. Some jurisdictions have used chevron-shaped in-lane markings, otherwise known as Converging Chevron Markings.

APPLICATION:

On neighborhood local or collector streets where a problem of speeding traffic has been documented, speed reduction markings may be applied. Because optical speed bars and converging chevron markings are placed in the tire paths of vehicles, they are subject to increased wear. For this reason, thermoplastic marking material is usually used instead of paint.

Application of these types of speed reduction markings should conform to the standards and guidance in the MUTCD.

Advantages

- Markings are relatively easy and low cost to install.
- Traffic striping does not slow emergency vehicles.

Disadvantages

- Long-term effectiveness is undocumented.
- Regular maintenance is required. Markings must be reapplied approximately every 6 years.

Effectiveness Scorecard

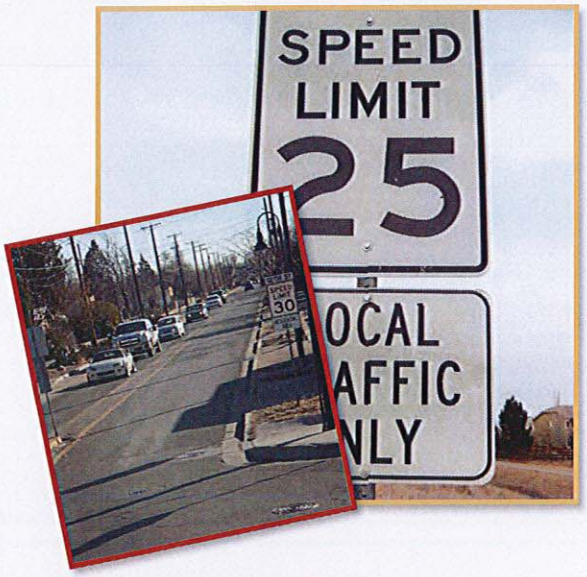
Speed	Fair
Volume	Poor
Cut-through	Poor
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Speed Limit Signage



Advantages

- Speed Limit signs provide a clear indication of the speed limit and undisputable basis for enforcement.
- Speed Limit signs are relatively easy and low-cost to install.
- Speed Limit signs do not slow emergency vehicles.

Disadvantages

- Signs alone do not guarantee responsible driving behavior.
- Overuse of unnecessary signs creates visual clutter that detracts from the conspicuity of other important signs and leads to loss of effectiveness.
- Posted speed limits that are below 25 MPH, below the 85th percentile speed for a roadway, or at an unrealistically low speed will not be respected by most drivers, and will breed disrespect for speed limits in general.
- Signs require regular maintenance. Signs must be replaced approximately every 8 years.

DESCRIPTION:
Regulatory Speed Limit signs (MUTCD R2 1) are installed along streets to notify and remind drivers of the legal speed limit.

APPLICATION:
The standard speed limit on residential streets per the City of Albuquerque Code of Ordinances is 25 MPH:

Because by default, the 25 MPH speed limit applies on all residential streets, the City does not post regulatory Speed Limit signs on every such street. However, where a problem of speeding traffic has been documented, signs may be installed to remind drivers to check their speed.

If used, the City will install Speed Limit signage in conformance with the City of Albuquerque Code of Ordinances and the MUTCD. Speed Limit signs of nonconforming designs or colors, or nonconforming speed values (other than multiples of 5 MPH) will not be installed.

Requests for posting speeds lower than the standard residential speed limit of 25 MPH will be subject to the requirement in the City of Albuquerque Code of Ordinances that an engineering and traffic study be conducted.

Effectiveness Scorecard

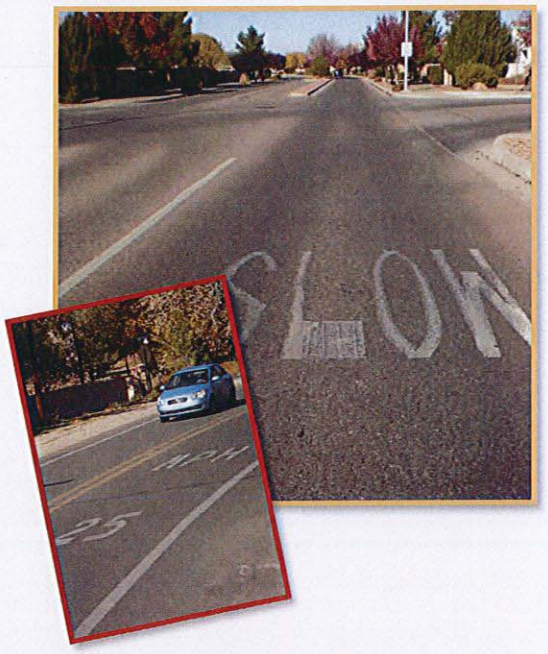
Speed	Fair
Volume	Poor
Cut-through	Poor
Crashes	Fair
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$

Very Good · Good · Fair · Poor · Not Applicable

Quick Glance

SPEED LIMIT 25

Speed L
Pavement Markings



DESCRIPTION:

Speed limit pavement markings are numerals applied in the traffic lane to remind drivers of the regulatory speed limit. In addition, a "SLOW" word legend may be applied with the speed legend.

APPLICATION:

Where a problem of speeding traffic has been documented, speed limit pavement markings may be installed to remind drivers to check their speed.

On residential streets, the standard speed limit is 25 MPH (see discussion on the sheet for Speed Limit Signs). On these streets, speed limit pavement markings may be used alone without posting a regulatory speed limit sign. On streets where the speed limit is greater or less than 25 MPH, speed limit pavement markings must be placed in conjunction with regulatory signs, as the pavement markings alone are not enforceable under state traffic laws or City of Albuquerque ordinances.

Advantages

- Provides a clear indication of the speed limit to drivers who are watching the road.
- Do not become obscured by street-side vegetation growth, parked trucks, or other obstructions.
- Relatively easy and low cost to install.
- Do not slow emergency vehicles.

Disadvantages

- Used alone do not guarantee responsible driving behavior.
- Used alone have not been shown to significantly reduce traffic speeds.
- Require regular maintenance. Markings must be reapplied approximately every 6 years.

Effectiveness Scorecard

Speed	Fair
Volume	Poor
Cut-through	Poor
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Ra
Pavement Markers

DESCRIPTION:

Raised pavement markers (RPMs), also known as "Botts' Dots," are 4 inch diameter by 3/4 inch high nonreflective round ceramic or plastic markers that are epoxied to the pavement to supplement or substitute for painted markings.

Retroreflective raised pavement markers (RRPMs) are typically 4 inch-square raised markers that have one- or two-way retroreflective faces that make them visible to traffic at night.

As a traffic-calming device, RPMs can be used to delineate a centerline or lane line, making drivers feel more restricted and thereby inducing them to lower their speeds. Unlike painted stripes alone, RPMs provide tactile feedback to drivers as their tires roll over them, alerting drivers that they are crossing out of their lane.

Advantages

- RPMs/RRPMs are relatively easy and low cost to install.
- RPMs/RRPMs do not slow emergency vehicles.

Disadvantages

- Regular maintenance is required. RPMs must be replaced as they become dislodged over time.
- RPMs should not be used on any streets, such as in the Northeast foothills, where the roads may be plowed after snowfall.
- Residents may complain of noise from vehicles driving over RPMs.

APPLICATION:

On neighborhood local or collector streets where a problem of speeding traffic has been documented, RPMs may be installed along a centerline either alone or with a painted line (see the toolbox application for centerline striping). This is most suited to curvilinear streets, where RPMs can reinforce lane designations, causing drivers to slow to maintain their travel within their lane.

RPMs may also be applied to supplement or substitute for painted hatching of pavement areas not open to normal travel, such as where the roadway has been narrowed for traffic calming, or on approach to a bulbout, median, or island.

RPMs and RRPMs should always match the color (yellow or white) of the pavement markings for which they supplement or substitute. The MUTCD guidelines recommend that where RPMs substitute for painted markings, that RRPMs be included at specific spacing and locations for nighttime visibility.

RPMs should not be positioned along bicycle lanes or edge lines on shoulders used by bicycles.

Effectiveness Scorecard

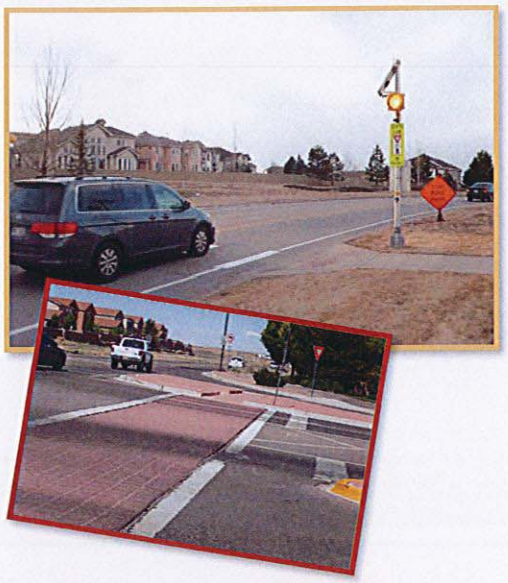
Speed	Good
Volume	Poor
Cut-through	Poor
Crashes	Good
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Fair
Noise	Poor
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

High Visib Crosswalks



DESCRIPTION:

High visibility crosswalks utilize striping patterns, advance markings, raised pavement markers, enhanced signage, activated flashing beacons, and/or activated in-pavement lights to improve the visibility of the crossing. Various special pavement treatments may also be used to create a visual and tactile demarcation of the crosswalk, including colored pavement, pavers, patterned concrete, or applied surfacings.

APPLICATION:

At locations where safe pedestrian crossings are a concern due to poor visibility, speeding traffic, or vulnerable user types (school children, elderly, vision or hearing impaired pedestrians), the various treatments listed above may be employed to address the specific deficiencies identified. The standard crosswalk marking style in the City of Albuquerque is the continental type (a series of 24" x 10' bars), which is highly visible. Enhancements are best applied only where there is a high volume of pedestrian usage.

Advantages

- Increases driver awareness of the crossing.
- Attracts pedestrians to a single crossing location.
- Pavement treatments can be aesthetically pleasing.

Disadvantages

- May give pedestrians a falsely high sense of safety.
- More complex installations (lights, pavement treatments) can be costly.
- May result in increased maintenance costs for pavement treatments, beacon systems, and in-pavement lights.

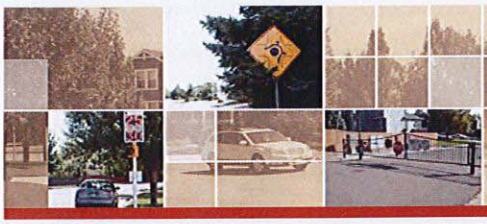
Effectiveness Scorecard

Speed	Fair
Volume	Poor
Cut-through	Poor
Crashes	Good
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Good
Noise	N/A
Cost	$$

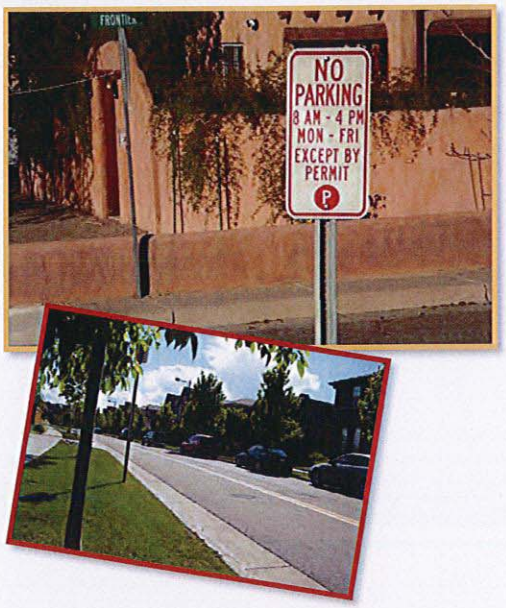
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO



Parking Strategies



DESCRIPTION:

In many city neighborhoods, parking issues are just as important to the residents as traffic speeding and volume issues. While some parking treatments can themselves serve traffic calming purposes, consideration of parking issues should be made when applying any of the traffic calming tools outlined in this program. Several of the non-physical, narrowing, and horizontal measures may reduce or eliminate available parking, while others may offer opportunities to create additional parking.

APPLICATION:

As part of any assessment for implementing traffic calming, the parking issues in the neighborhood should be identified at the outset. Is the supply of parking adequate for the demand? Are there parking intrusion issues from nearby land uses? The City of Albuquerque has implemented residential permit parking on some streets around Downtown, the State Fairgrounds, and UNM to address intrusion issues. While parallel parking is the default on most neighborhood streets, streets may be converted to angled or perpendicular parking to increase available spaces.

Advantages

- Reconfiguring the use of available street width can increase parking where needed.
- No Parking zones near intersections and driveways can improve safety for motorists, pedestrians and cyclists.
- The presence of perpendicular or angled parked vehicles reduces traffic speeds.

Disadvantages

- Angled and parallel parking preclude bike lanes.
- Frequent driveways limit parking treatment options.
- Angled and parallel parking increase backing-out collision potential.

Effectiveness Scorecard

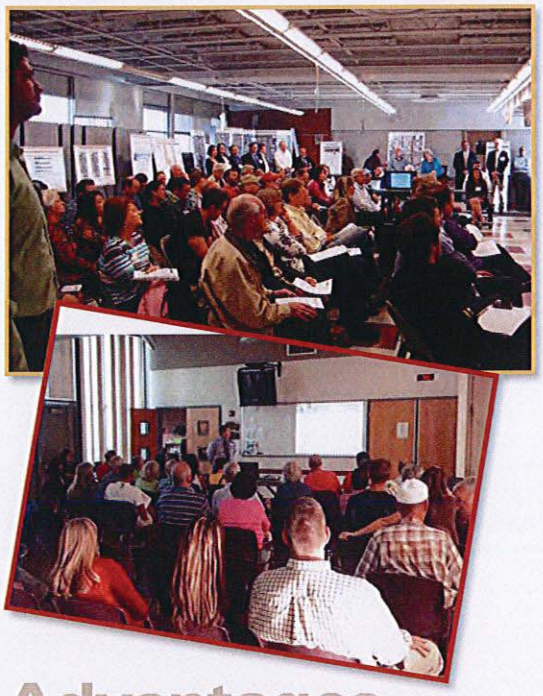
Speed	Fair
Volume	Fair
Cut-through	Fair
Crashes	Fair
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Fair
Noise	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Education
Community Involvement



DESCRIPTION:

Educational traffic calming measures include working with neighborhoods to make residents aware of speed limits, traffic laws, and safe driving habits, and enlisting their support in practicing and promoting safe and lawful driving habits. Individual program components may include presentations at neighborhood meetings, local workshops, school programs, yard signs, neighborhood flyers or letters, and individual pledge letters to obey speed limits and traffic laws.

APPLICATION:

Public education is an important element in any traffic calming program. While most neighborhood traffic problems are perceived to be caused by "outsiders," the majority of traffic—and problem traffic—in a neighborhood is usually fellow neighbor drivers. Public education programs seek to make all drivers more aware of their own driving behavior and the impact it has on others. As such, it is recommended that neighborhoods applying for traffic calming treatments first attend a traffic calming educational forum with the City.

Staff from the City of Albuquerque, Traffic Engineering Division and the Albuquerque Police Department are available to address neighborhood association meetings or other groups regarding safe driving and the traffic calming program. The Albuquerque Police Department offers "Slow Down Albuquerque" campaign yard signs free to residents who make a personal commitment to not speed on Albuquerque streets. Details are available at http://www.cabq.gov/police/programs/slow-down-albuquerque.

Advantages

- Heightens driver awareness of traffic laws and their own driving behaviors.
- Allows residents to meet, share their views, and move toward consensus on the issues.
- Communicates the identified issues to City staff.

Disadvantages

- May require considerable City staff time.
- Meetings need to be actively led to maintain focus.

Effectiveness Scorecard

Speed	◒
Volume	◒
Cut-through	◒
Crashes	◒
Emergency Vehicle	◒
Pedestrian	◒
Bicycle	◒
Noise	◒
Cost	$

● Very Good ◕ Good ◒ Fair ◔ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Sig
Turn Restrictions

DESCRIPTION:

Regulatory movement prohibition signs (conforming to R3 1, R3 2, R3 3, R3 4, R3 18, or R3 27 of the MUTCD) are placed at intersections to prevent turning movements associated with cut-through traffic patterns.

APPLICATION:

On neighborhood streets where a problem of cut-through traffic has been documented, movements at intersections feeding the cut-through route may be restricted by signage so that traffic is routed to a more appropriate collector or arterial. If the problem is documented to occur mainly during a certain period, such as morning or afternoon school drop-off times, the movement prohibition can be posted to apply only during those hours.

Turn prohibitions are most effective when placed on an arterial or collector on the periphery of a neighborhood to prevent cut-through traffic from entering the neighborhood. Wherever posted, an assessment should be made of the resulting downstream route as well as alternate cut-through routes to assure that the problem is not just pushed to another location or neighborhood.

Prohibitions are most effective when limited to posted hours. For full-time movement prohibitions, physical measures are more effective and appropriate.

In other cities, violation rates have been shown to be about 50 percent in the absence of enforcement. The violation rate can be lowered 20 percent with active enforcement.

Advantages

- Effective in addressing time-of-day cut-through traffic problems.
- Movement prohibition signs are relatively easy and low cost to install.
- Movement prohibition signs do not slow or divert emergency vehicles.

Disadvantages

- Compliance is low for signs alone without enforcement.
- May increase trip length for some drivers.
- May adversely affect downstream or adjacent traffic patterns.
- Signs require regular maintenance. Signs must be replaced approximately every 8 years.

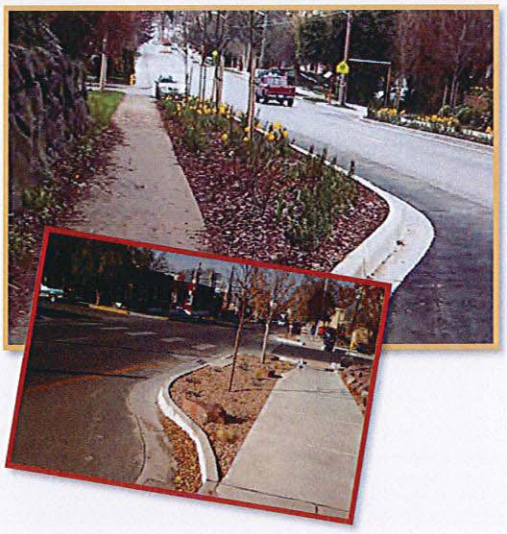
Effectiveness Scorecard

Speed	Good
Volume	Good
Cut-through	Good
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

Neckdowns and Bulbouts



DESCRIPTION:

Neckdowns are raised curb extensions at intersections that reduce the roadway width from curb to curb. Neckdowns increase pedestrian comfort and safety at intersections by shortening crossing distances for pedestrians and drawing attention to pedestrians via raised peninsulas. They also tighten the curb radii at the corners, reducing the speeds of turning vehicles. The magnitude of speed reduction is dependent on the spacing of neckdowns between points that require drivers to slow.

APPLICATION:

Neckdowns implemented midblock as a vehicle speed control measure and pedestrian enhancement are most effective when constructed with permanent raised curbs but can be implemented using striping. Bulbouts occur at the corners of intersections using raised curbs to extend the sidewalks and narrow the travel lanes. This slows vehicles by providing visual cues of pedestrian activity as well as by reducing the curb radii. Both the crossing distance and the time pedestrians are exposed to traffic are reduced.

Advantages

- Decreases vehicle speeds
- Reduces pedestrian crossing distance
- Clearly delineates areas of pedestrian activity

Disadvantages

- May reduce on-street parking
- Complicates drainage design
- Reduces bicycle lane and/or side of road area used by bicyclists
- May slow right-turning emergency response vehicles

Effectiveness Scorecard

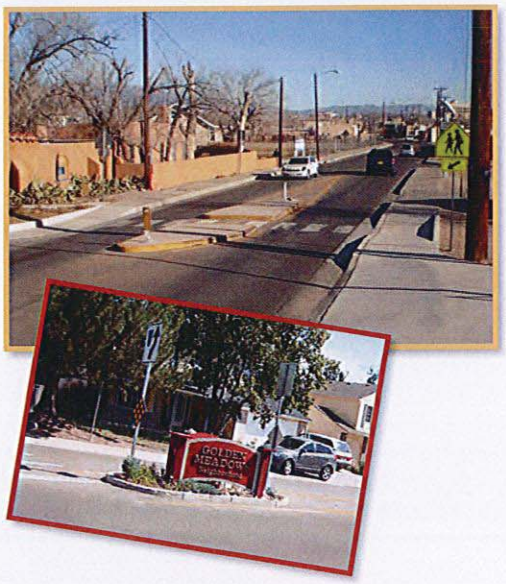
Speed	Very Good
Volume	Fair
Cut-through	Fair
Crashes	Fair
Emergency Vehicle	Fair
Pedestrian	Very Good
Bicycle	Fair
Noise	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Lane Narrowing
Center Isl
Pedestrian Refuge



DESCRIPTION:

The construction of a center island on a wider street can serve to reduce the width of the travel lanes and to provide a pedestrian refuge area. This device has similar effects on speed and pedestrians as the neckdown by providing visual cues to an area of pedestrian activity, reducing vehicle speeds, and shortening the pedestrian crossing distance

APPLICATION:

A center island can be constructed strictly as a speed reducing measure at a midblock location without the pedestrian refuge. Where pedestrians are present the median island can be designed to serve as a pedestrian refuge. When combined with high visibility signage a center island can encourage pedestrian crossing at a desired location. Another variation of this device is as a neighborhood gateway. At an intersection or entryway, the center island provides an area for neighborhood signage and landscaping.

Advantages

- Decreases vehicle speeds
- Reduces pedestrian crossing distance
- Clearly delineates areas of pedestrian activity
- Opportunity for landscaping, visual enhancement, and neighborhood

Disadvantages

- May reduce on-street parking
- Longer islands may impact driveway access and result in u-turns
- May impact snow removal operations

Effectiveness Scorecard

Speed	
Volume	
Cut-through	
Crashes	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	N/A
Cost	$$$

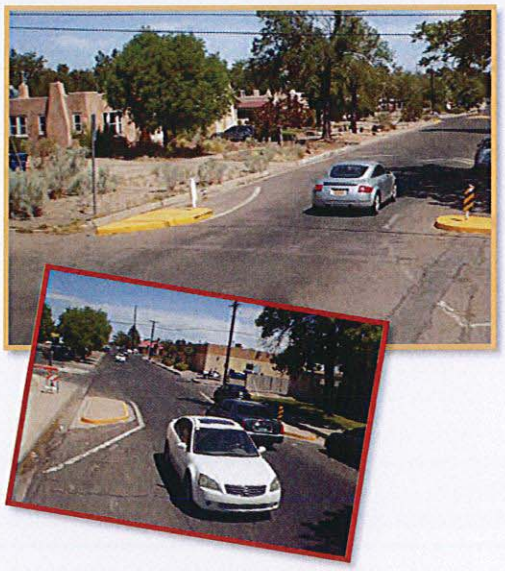
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO

Two-lane Choker



DESCRIPTION:

For a two-lane choker, curb extensions are constructed midblock to narrow the travel way but still provide for one lane in each direction. The resultant narrower street cross section decreases vehicle speeds and can reduce cut through traffic.

APPLICATION:

Similar to neckdowns, two-lane chokers are implemented midblock as a vehicle speed control measure. They are most effective when constructed with permanent raised curbs but can be implemented using signing, striping, and delineators. The raised curb extensions, approach signing, and narrower travel lanes slow vehicles and discourage cut through travel by providing visual cues of a slower speed environment.

Advantages

- Decreases vehicle speeds
- Can reduce cut through traffic

Disadvantages

- May reduce on-street parking
- Complicates drainage design
- May require additional maintenance
- Reduces bicycle lane and/or side of road area used by bicyclists

Effectiveness Scorecard

Speed	Fair
Volume	Fair
Cut-through	Fair
Crashes	Fair
Emergency Vehicle	Good
Pedestrian	N/A
Bicycle	Fair
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

One-lane Choker

pedbikesafe.org

DESCRIPTION:

For a one-lane choker, curb extensions are constructed midblock to narrow the travel way to a single lane width. This configuration forces vehicles to slow down, yield, and negotiate oncoming traffic. While two-way access is maintained approaching the choker only a single lane is provided at the device. This results in a much narrower street cross section that decreases vehicle speeds and reduces cut through traffic.

APPLICATION:

One-lane chokers are implemented midblock as a vehicle speed control measure on lower speed and lower volume local streets. They are constructed with permanent raised curbs but can be implemented using signing, striping, and delineators with reduced effectiveness. The raised curb extensions, approach signing, and narrow single lane travel way slows vehicles and discourages cut through travel by providing visual cues of a slower speed environment and forcing vehicles to negotiate oncoming traffic.

Advantages

- Decreases vehicle speeds
- Reduces cut through traffic

Disadvantages

- Perceived to be less safe because oncoming vehicles are required to share a single travel lane
- May reduce on-street parking
- Complicates drainage design
- May require additional maintenance
- Reduces bicycle lane and/or side of road area used by bicyclists

Effectiveness Scorecard

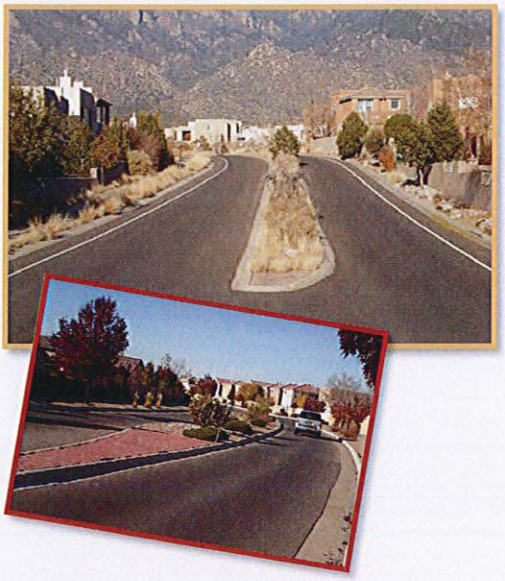
Speed	Very Good
Volume	Very Good
Cut-through	Very Good
Crashes	Poor
Emergency Vehicle	Poor
Pedestrian	N/A
Bicycle	Poor
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Roadside Median Landscaping



DESCRIPTION:

Landscaping involves adding plants, trees, or other vegetation to the roadside and/or medians. Landscaping is used to break long vistas of pavement in order to narrow the appearance of a roadway and add mass to the appearance of median devices. Landscaping also improves the aesthetics of a neighborhood street.

APPLICATION:

Landscaping is best suited for wide, straight neighborhood roadways with unobstructed views and a history of speeding. Landscaping may be used in conjunction with other traffic calming devices, such as medians and detached sidewalks, or it may be added to the roadside as an isolated source for reducing speed.

Advantages

- May reduce vehicle speed
- May improve pedestrian safety
- Enhances neighborhood appearance
- Provides an opportunity to partner with citizens committed to maintaining landscaping

Disadvantages

- Requires regular maintenance
- May be difficult to establish and maintain certain plantings
- Increases water usage in a semi-arid climate

Effectiveness Scorecard

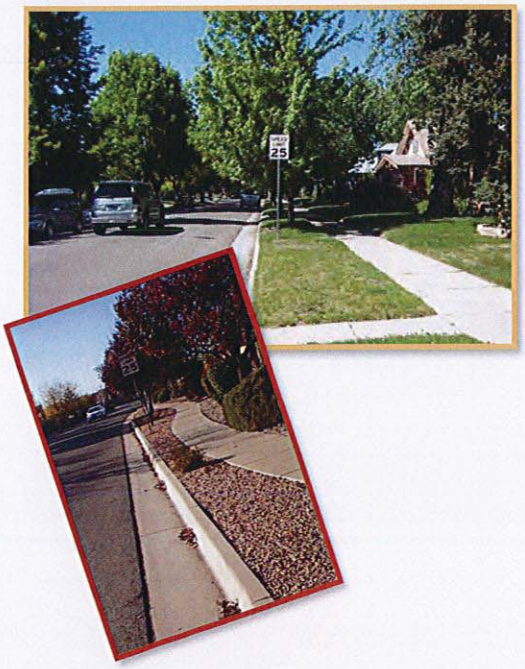
Speed	Fair
Volume	N/A
Cut-through	N/A
Crashes	N/A
Emergency Vehicle	N/A
Pedestrian	Fair
Bicycle	Fair
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Road Narrow
Detached Sidewalks



DESCRIPTION:

A detached sidewalk is a sidewalk that is separated from a curb by grass, trees, landscaping, street lights, or other streetscape elements. Narrowing the roadway in order to detach sidewalks physically narrows the travel lanes. The use of vertical elements in the streetscape further reduces the optical width of a roadway, and discourages speeding.

APPLICATION:

Detached sidewalks are a useful application for residential streets with wide travel ways, a history of high speeds, and pedestrian traffic.

Advantages

- Increases pedestrian safety and reduces the width of pedestrian crossings
- Enhances streetscape
- Reduces vehicle speeds

Disadvantages

- Landscaping maintenance may be required
- Detached sidewalks are not as effective as physical measures in slowing speeds
- Expensive

Effectiveness Scorecard

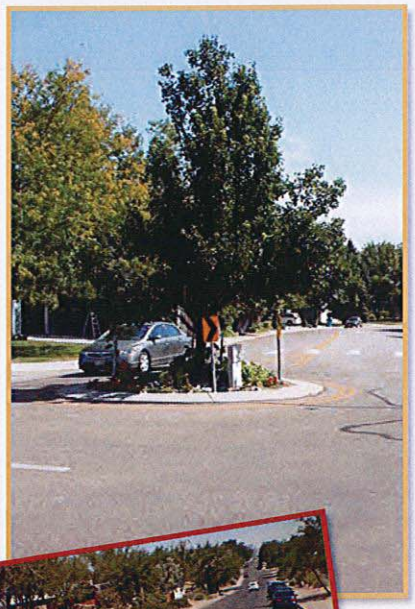
Speed	Good
Volume	N/A
Cut-through	N/A
Crashes	N/A
Emergency Vehicle	Good
Pedestrian	Very Good
Bicycle	Fair
Noise	N/A
Cost	$$$

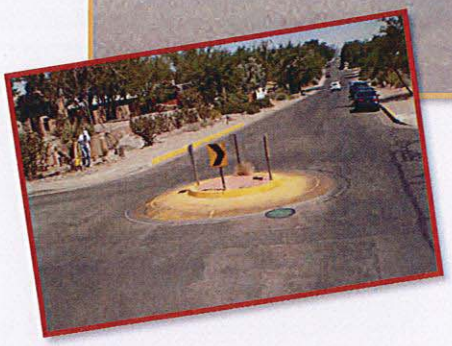
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Traffic Circle





DESCRIPTION:

Traffic circles are raised islands, placed in intersections, around which traffic circulates. Yield signs can be used as traffic controls at the approaches of the traffic circle. Circles prevent drivers from speeding through intersections by impeding through movements and forcing drivers to slow down to yield

APPLICATION:

Traffic circles are effective at neighborhood and local street intersections where large vehicle traffic is not a major concern but speeds, volumes, and safety are recorded problems.

Advantages

- Effective at slowing travel speed
- Improves safety
- Provides increased access to main street from side street

Disadvantages

- Slows emergency vehicles and can be difficult for large vehicles to circumnavigate
- May eliminate some on-street parking
- May require modifications to curb, gutter, and sidewalks

Effectiveness Scorecard

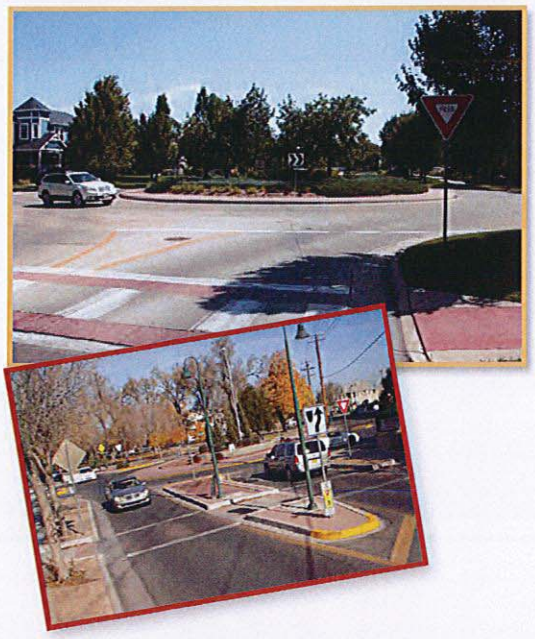
Speed	●
Volume	◒
Cut-through	◒
Crashes	◔
Emergency Vehicle	◒
Pedestrian	◒
Bicycle	◒
Noise	◒
Cost	$$$

● Very Good ◔ Good ◒ Fair ◠ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Roundal
(single-lane)



DESCRIPTION:

Roundabouts require traffic to circulate counterclockwise around a center island. Unlike traffic circles, roundabouts are used on higher volume streets to allocate right-of-way among competing movements. They are larger than neighborhood traffic circles, have raised islands to channel approaching traffic to the right, and do not have stop signs. Roundabouts provide inexpensive-to-operate traffic control as an alternative to a traffic signal.

APPLICATION:

Roundabouts are typically substituted for a traffic signal. They are most appropriate for new developments, due to the right-of-way requirements and construction cost. If being considered in an established location the following should be considered as criteria for application:

- Locations with a history of accidents
- Intersections where queues need to be minimized
- Intersections with irregular approach geometry
- Intersections that have a high proportion of U-turns
- Locations with abundant right-of-way

Advantages

- Enhanced safety compared to traffic signals or stop signs
- Minimize queuing at approaches
- Less expensive to operate than traffic signals
- Generally aesthetically pleasing if well landscaped

Disadvantages

- May be difficult for large vehicles to circumnavigate
- Must be designed so that the circulating lane does not encroach on the crosswalks
- May reduce on-street parking
- Landscaping must be maintained by the residents or by the municipality

Effectiveness Scorecard

Speed	Very Good
Volume	N/A
Cut-through	Poor
Crashes	Very Good
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Fair
Noise	Good
Cost	$$$$

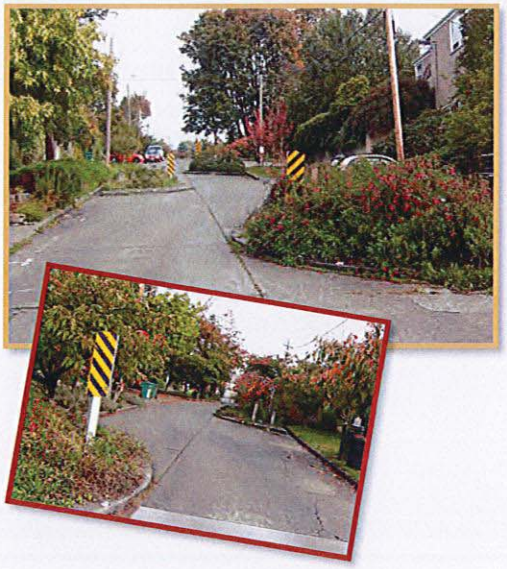
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO

Chicane



DESCRIPTION:

Chicanes are curb extensions that alternate from one side of the roadway to the other, forming s-shaped curves. Chicanes insert curvature in an otherwise straight stretch of roadway. They generally fall into two categories: single-lane and two-way. Single lane chicanes consist of staggered build outs narrowing the road so that traffic in one direction has to give way to opposing traffic. Two-way chicanes use build outs to provide curvature, but the lanes are separated by road markings or a central island.

APPLICATION:

On a neighborhood street with a recorded speed problem, chicanes may be installed to reduce speeds in order to negotiate the lateral displacements in the vehicle path. They are most effective when placed on existing streets that have long, straight, flat roadway sections. They are also most effective when used in a series. They are useful at locations where speed is a problem, but the noise associated with speed humps and related measures would be unacceptable.

Advantages

- Offer visual traffic calming effect by reducing line of sight
- Can reduce pedestrian crossing distance
- Reduces travel speeds
- Negotiable by emergency vehicles
- Provide opportunities for streetscaping

Disadvantages

- May divert traffic to adjacent roadways
- The effect on vehicle speeds is limited
- May require bicyclists to merge with vehicular traffic for a short distance
- May require removal of some on-street parking
- Curb realignment and landscaping can be costly, especially if there are drainage issues

Effectiveness Scorecard

Speed	Good
Volume	Fair
Cut-through	Fair
Crashes	N/A
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Fair
Noise	Fair
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Lateral Shift

Advantages

- Community acceptance is generally higher
- Fewer maintenance issues than a comparable method
- Does not reduce traffic volumes unless design includes a lane reduction
- Negotiable by emergency vehicles

Disadvantages

- Impacts snow maintenance
- May require additional effort to properly design
- May reduce on-street parking

DESCRIPTION:
A lateral shift consists of curb extensions along straight streets that cause travel lanes to jog. It is like a chicane, however the roadway alignment only shifts once. Relative to chicanes, speeds remain higher since the configuration does not include a series of alternating curb extensions.

APPLICATION:
Lateral shifts may be used on neighborhood collectors where high traffic volumes and high posted speeds prevent more abrupt measures.

Effectiveness Scorecard

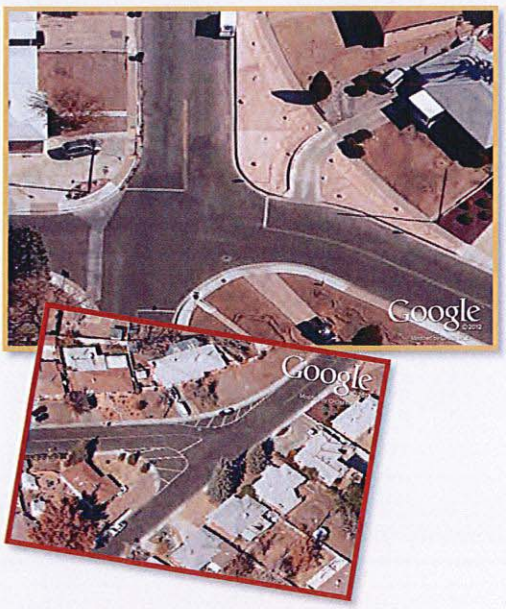
Speed	Fair
Volume	N/A
Cut-through	Fair
Crashes	N/A
Emergency Vehicle	Good
Pedestrian	Fair
Bicycle	Fair
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Realigned Intersection



DESCRIPTION:

Realigned intersections are changes in alignment that convert T-intersections with straight approaches into curving streets that meet at right-angles. A former "straight-through" movement along the top of the T becomes a turning movement. They are one of the few traffic calming measures available for T-intersections since the straight top of the T makes deflection difficult to achieve, which is necessary for traffic circles.

APPLICATION:

Re-alignment can be an effective treatment at neighborhood T-intersections where a speeding problem has been documented.

Advantages

- Realigned intersections can effectively reduce speeds and improve safety at T-intersections that are commonly ignored by motorists.

Disadvantages

- The curb realignment can be costly
- They may require some additional right-of-way to cut the corner

Effectiveness Scorecard

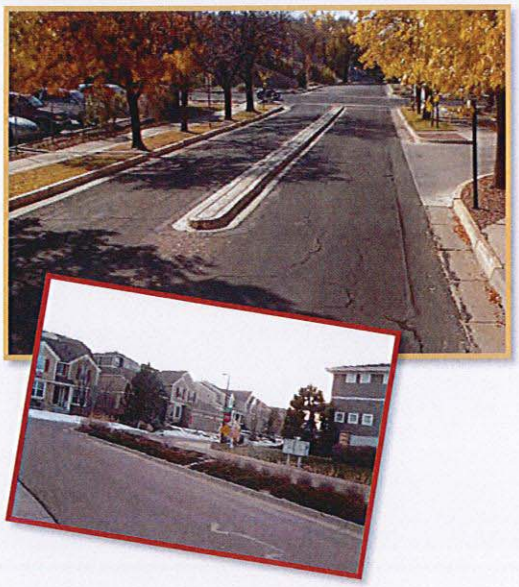
Speed	Very Good
Volume	Fair
Cut-through	Fair
Crashes	N/A
Emergency Vehicle	Very Good
Pedestrian	N/A
Bicycle	N/A
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Medians
Partial Medians



DESCRIPTION:

A median is a raised curb island placed at the center of a roadway. Medians are typically concrete and may include landscaping to provide additional visual enhancement. They provide physical separation between on-coming traffic lanes, narrow the travel lanes, and can create the perception of a narrower roadway. They can also act as a refuge for pedestrians in certain applications.

APPLICATION:

Medians may be used for speed reduction, turn restrictions, enhanced safety, or a mix of all three. Medians are best suited for wide residential streets with a history of high speeds to narrow the travel lanes, interrupt sight distances, and reduce pedestrian crossing distances.

Advantages

- May help reduce travel speed
- Separates opposing traffic lanes
- Shortens pedestrian crossings
- Can improve safety both for vehicles and pedestrians

Disadvantages

- Potential for increased maintenance if landscaped
- Medians are not as effective as speed humps or traffic circles in slowing speeds
- May interrupt emergency access and operations
- May interrupt driveway/side street access and result in U-turns at the end of medians
- Can create drainage issues

Effectiveness Scorecard

Speed	
Volume	
Cut-through	
Crashes	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	N/A
Cost	$$$

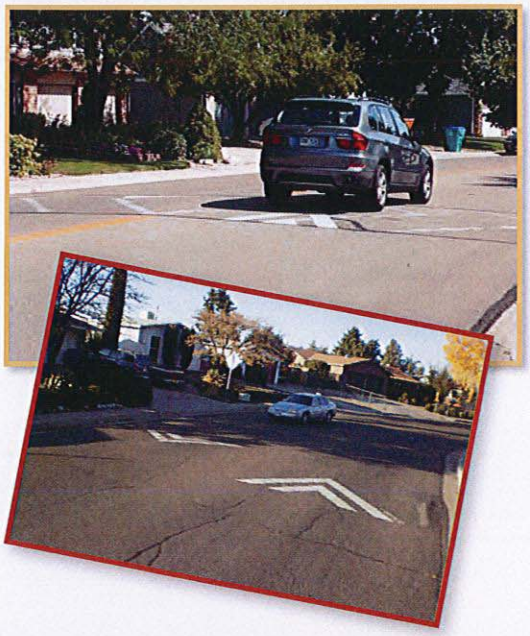
Very Good · Good · Fair · Poor · N/A Not Applicable

CITY OF ALBUQUERQUE · NEW MEXICO · 1706

Quick Glance

SPEED LIMIT 25

Speed Hump



DESCRIPTION:

Speed humps are common traffic management devices that are familiar to most drivers. Speed humps consist of raised pavement placed across the entire roadway width creating a vertical deflection to slow vehicles. The humps are often 12 feet in length and between 3 and 3.5 inches high.

APPLICATION:

Speed humps are installed on neighborhood streets to address speed, volume, and cut-through traffic. Speed humps are designed and constructed to allow vehicles to travel at or near the posted speed limit. They are spaced close enough together to limit drivers speeding in between them but far enough apart to not cause a nuisance to local residents.

Advantages

- Decreases vehicle speeds
- Discourages cut through traffic
- Inexpensive and easy to construct

Disadvantages

- May cause speeding between humps
- May divert traffic to an adjacent neighborhood street
- May increase noise levels as vehicles decelerate and accelerate

Effectiveness Scorecard

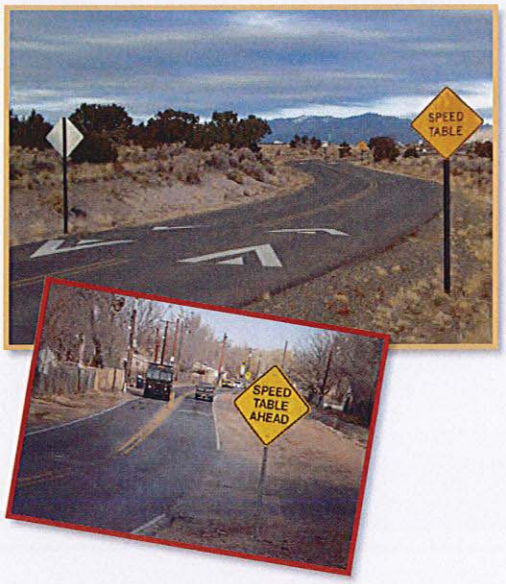
Speed	●
Volume	◕
Cut-through	◕
Crashes	◒
Emergency Vehicle	◔
Pedestrian	◕
Bicycle	◕
Noise	◔
Cost	$

● Very Good ◕ Good ◒ Fair ◔ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Speed Table



DESCRIPTION:

Speed tables are trapezoidal shaped speed humps with a flat section in the middle and ramps on the ends. They are sometimes constructed with textured materials on the flat section and are generally long enough for the entire wheelbase of a passenger vehicle to rest on the flat section. The long flat design allows cars to pass without slowing as significantly as with speed humps. Speed tables can also be used in conjunction with curb extensions, curb radius reductions, and textured crosswalks.

APPLICATION:

A speed table may be appropriate on local residential streets with recorded high traffic speeds and a traffic volume of at least 400 vehicles per day and up to 4,000 vehicles per day. Short streets are unlikely to benefit from the treatment.

Advantages

- Effective at slowing travel speed
- Possible reduction in traffic volumes depending on available alternate routes
- Possible decrease in collisions
- In cases with crosswalk, increases pedestrian visibility and likelihood that driver yields to pedestrian
- Typically preferred by EMS compared with speed humps

Disadvantages

- May inadvertently divert local drivers to another route to avoid the calming measure
- Textured materials can be expensive, if used
- May increase noise and air pollution
- May not be appropriate along bus or emergency routes
- Drainage impacts need to be considered in the design

Effectiveness Scorecard

Speed	●
Volume	◕
Cut-through	◕
Crashes	◓
Emergency Vehicle	◔
Pedestrian	◕
Bicycle	◕
Noise	◔
Cost	$

● Very Good ◕ Good ◓ Fair ◔ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Speed Kidney

Institute of Transportation Engineers Journal December 2012

Advantages

- Decreases vehicle speeds
- Discourages cut through traffic
- Inexpensive and easy to construct

Disadvantages

- May cause speeding beyond the speed kidney
- May divert traffic to an adjacent neighborhood street
- May increase noise levels as vehicles decelerate and accelerate

DESCRIPTION:

Speed Kidneys are an arrangement of three speed lumps elongated with a curvilinear shape in the direction of traffic. The main speed lumps of the speed kidney are placed in the travel lane, while a complimentary speed lump is placed between the lanes. Passenger vehicle drivers choosing to drive over the speed kidneys in a straight path experience vertical discomfort as two or four wheels traverse the different parts of the speed kidney. Passenger vehicle drivers may also choose to take a curvilinear path to avoid the vertical deflection. In either case, field evaluation has documented speed reductions. The effective width of the speed kidney is narrow enough to allow emergency vehicles and trucks to follow a straight path straddling the in-lane lump

APPLICATION:

Speed kidneys may be installed on neighborhood streets to address speed, volume, and cut-through traffic and are designed and constructed to allow vehicles to travel at or near the posted speed limit. Speed Kidneys have the advantage over speed humps, speed lumps, and speed cushions in that passenger car drivers may adapt their travel path to the device and avoid any vertical deflection. Bicyclists may also negotiate the device without crossing any vertical deflection. Design parameters should follow those recommended by researchers at the Universitat Politècnica de València and as documented in the December 2012 issue of the ITE Journal.

Effectiveness Scorecard

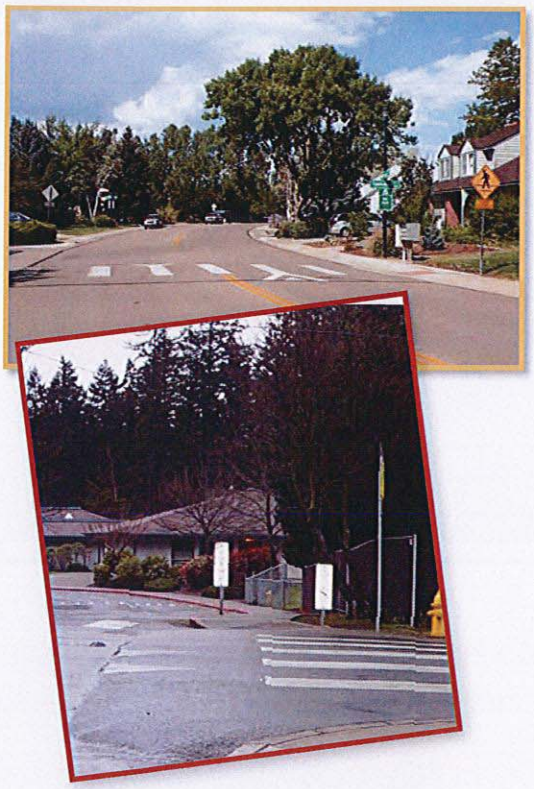
Speed	Very Good
Volume	Good
Cut-through	Good
Crashes	Fair
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Good
Noise	Fair
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Raised Crosswalk



DESCRIPTION:

A raised pedestrian crosswalk is a speed table with crosswalk markings and signage to channelize pedestrians crossing a road. This type of calming measure raises the crosswalk to the level of the sidewalk to improve the visibility of pedestrians to motor vehicle drivers. They are trapezoidal in shape with a flat area for crossing pedestrians and ramps for the vehicle approaches traversing the raised crossing. The crossing often incorporates textured pavement materials.

APPLICATION:

Neighborhood streets with recorded speeding problems and haphazard pedestrian crossing locations will benefit most from this traffic calming measure. They can be used at intersections, mid-block crossings, and school crossings.

Advantages

- Improved safety for pedestrians and vehicles
- Effective at slowing travel speed, but not to the extent of speed humps
- Possible traffic volume decreases at locations where cut-through traffic is a problem
- Typically preferred by EMS compared with speed humps

Disadvantages

- Drainage impacts need to be considered in the design
- May increase noise and air pollution
- Textured materials are expensive, if used
- May inadvertently divert local trips to another route to avoid the calming measure

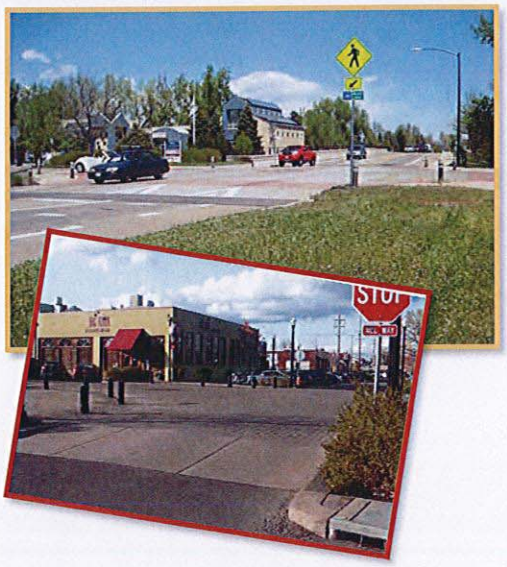
Effectiveness Scorecard

Speed	Very Good
Volume	Very Good
Cut-through	Very Good
Crashes	Fair
Emergency Vehicle	Poor
Pedestrian	Very Good
Bicycle	Very Good
Noise	Poor
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

Raised Intersection



DESCRIPTION:

A raised intersection refers to a roadway intersection that is entirely elevated above the travel way. It is essentially a speed table for the entire intersection. They are constructed with ramps on all vehicle approaches and often include textured materials on the flat, elevated section. Typically, they are raised to the level of the sidewalk or slightly below it, creating a pedestrian area that includes the sidewalk and crosswalks.

APPLICATION:

For neighborhood streets, raised intersections are best suited for intersections with substantial pedestrian activity. A raised intersection may not be appropriate if the street is a bus or emergency route.
Detectable warnings need to be included for those with vision impairment.

Advantages

- Enhances the pedestrian environment and increases safety at the intersection
- Eliminates need for curb ramps
- Can calm two streets at once
- Can have positive aesthetic value

Disadvantages

- Impacts to drainage need to be considered in design
- Textured pavement materials can make it difficult for vision impaired to identify detectable warnings
- Less effective in reducing speeds than speed humps, speed tables, or raised crosswalks
- They are expensive

Effectiveness Scorecard

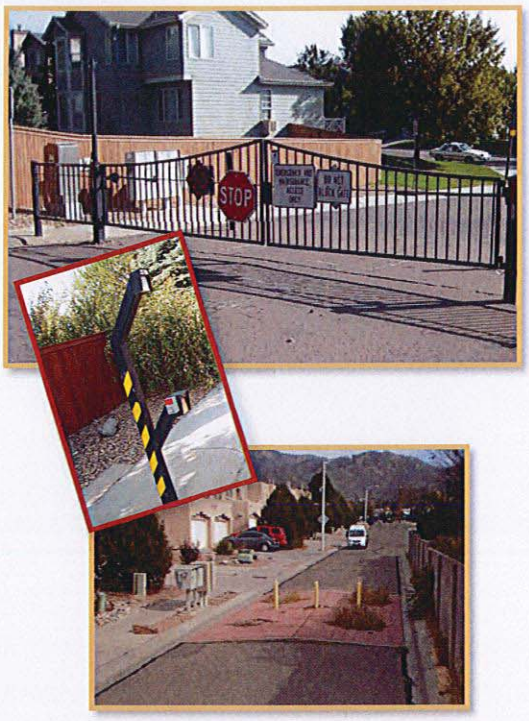
Speed	◔
Volume	N/A
Cut-through	N/A
Crashes	◒
Emergency Vehicle	◠
Pedestrian	●
Bicycle	◔
Noise	N/A
Cost	$$$

● Very Good ◔ Good ◒ Fair ◠ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Full Clo
(gate, midblock cul-de
intersection cul-de-sac)



DESCRIPTION:
Full closures typically involve the placement of temporary barriers or construction of permanent barriers across a street to completely close it to vehicular traffic. The closures vary from concrete barriers and bollards to gates and landscaped islands. Often gaps are left in the barriers to permit bicycle and pedestrian access. Automatic gates or removable bollards are sometimes used to accommodate emergency vehicles.

APPLICATION:
Full closures are particularly effective at addressing high volume, high speed, and cut through traffic. This device is often seen as a last resort for addressing neighborhood traffic problems because of the high degree of controversy, lengthy implementation time, and legal process needed to allow the closure of a public street.

Advantages
- Eliminates cut through traffic
- Reduces speeds and volume in immediate area

Disadvantages
- Statutory actions required for implementation
- Delays emergency vehicles
- Traffic diverted to adjacent streets may create new traffic problems
- Increased travel time and out of direction travel for local residents

Effectiveness Scorecard

Speed	Very Good
Volume	Fair
Cut-through	Very Good
Crashes	Fair
Emergency Vehicle	Poor
Pedestrian	Good
Bicycle	Good
Noise	Good
Cost	$$$$

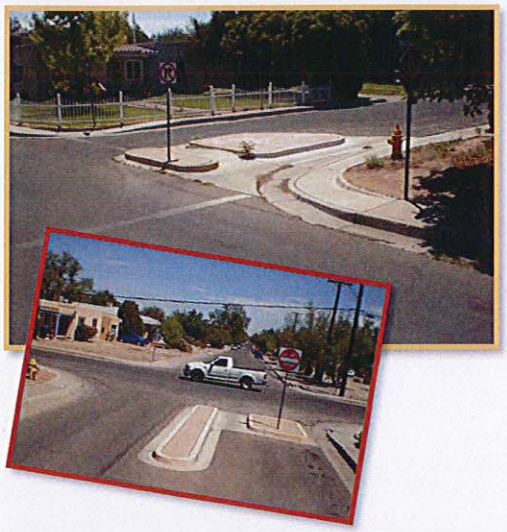
Very Good · Good · Fair · Poor · N/A Not Applicable

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO

Quick Glance

SPEED LIMIT 25

Partial Closure



DESCRIPTION:

Partial closures, also known as half street closures, typically involve the placement of temporary barriers or construction of permanent barriers across a portion of a street to prevent vehicular traffic in one direction. The partial closure most often occurs at an intersection for a short distance. The closures can consist of curb extensions, concrete barriers, bollards, and signs. Gaps in the barriers permit bicycle and pedestrian access and allow for drainage.

APPLICATION:

Partial closures are particularly effective at addressing high volume, high speed, and cut through traffic. When paired on multiple streets, particularly in a grid street system, partial closures can make travel through a neighborhood more circuitous.

Advantages

- Eliminates cut through traffic one direction
- Reduces speeds and volume in immediate area

Disadvantages

- Statutory actions required for implementation
- Delays emergency vehicles
- Traffic diverted to adjacent streets may create new traffic problems
- Increased travel time and out of direction travel for local residents

Effectiveness Scorecard

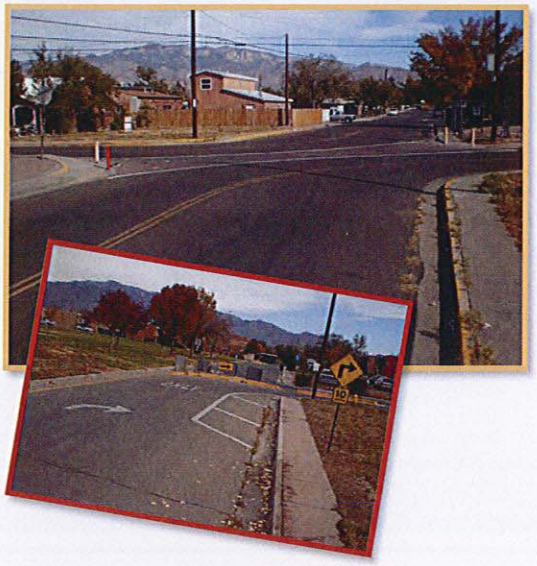
Speed	Very Good
Volume	Fair
Cut-through	Very Good
Crashes	Fair
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Good
Noise	Good
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Diagonal Diverter



DESCRIPTION:

Diagonal diverters involve the placement of temporary barriers or construction of permanent barriers diagonally across an intersection. The barrier connecting the opposing corners of the intersection serves to redirect through traffic movements while allowing turning movements. Gaps in the barriers permit bicycle and pedestrian access and allow for drainage.

APPLICATION:

Diagonal diverters are particularly effective at addressing high volume, high speed, and cut through traffic. When staggered on multiple streets, particularly in a grid street system, diagonal diverters can make travel through a neighborhood more circuitous

Advantages

- Reduces cut through traffic
- Reduces speeds and volume in immediate area

Disadvantages

- Statutory actions required for implementation
- Delays emergency vehicles
- Traffic diverted to adjacent streets may create new traffic problems
- Increased travel time and out of direction travel for local residents
- The adjacent corners of the intersection may require reconstruction to maintain adequate width for two-way traffic.

Effectiveness Scorecard

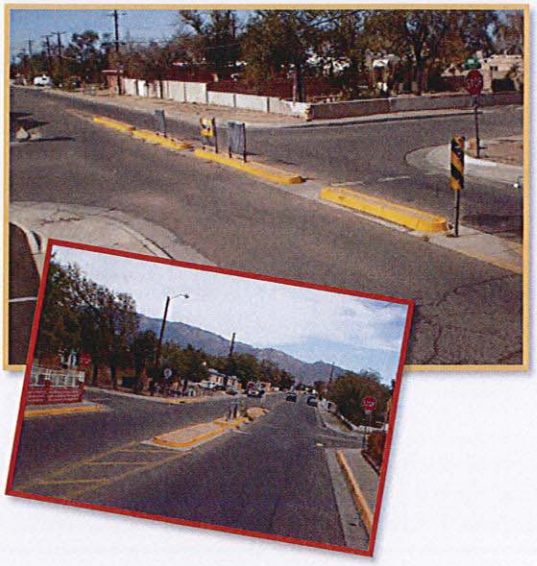
Speed	◕
Volume	◒
Cut-through	●
Crashes	◒
Emergency Vehicle	◒
Pedestrian	◕
Bicycle	◕
Noise	◕
Cost	$$$$

● Very Good ◕ Good ◒ Fair ◔ Poor N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Median Barrier



DESCRIPTION:

Median barriers, sometimes called median diverters, involve the construction of permanent raised islands along the centerline of a street. The median islands are extended through an intersection to effectively block cross street through traffic and left turning movements. Gaps in the island can permit bicycle and pedestrian access.

APPLICATION:

Median barriers are effective at addressing high volume, high speed, and cut through traffic. The median barrier prohibits both through traffic and left turning movements at two of the four intersection approaches. This essentially creates a right in right-in/right-out condition which can make travel through a neighborhood more circuitous.

Advantages

- Discourages cut through traffic
- Reduces speeds and volume in immediate area
- May improve intersection safety by eliminating vehicular conflict points

Disadvantages

- Delays emergency vehicles
- Traffic diverted to adjacent streets may create new traffic problems
- Increased travel time and out of direction travel for local residents
- May increase u-turning movements and encourage wrong way travel
- May require additional right of way and/or impact on street parking

Effectiveness Scorecard

Speed	
Volume	
Cut-through	
Crashes	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

Forced Turn Island

DESCRIPTION:

Forced turn islands involve the construction of raised islands at intersection approaches to prohibit certain turning movements. They can be implemented on a temporary or trial basis using parking blocks, delineators, and signage; or on a permanent basis with raised concrete curbs, barriers, bollards, and signs.

APPLICATION:

Forced turn islands are implemented to eliminate undesirable turning movements that allow neighborhood cut through traffic. When used in combination with turn restriction signage, median closures, and partial closures, forced turn islands provide additional means to direct through traffic to the collector roadway network and off neighborhood streets. Like these other devices, forced turn islands are just another way of making travel through a neighborhood more circuitous.

Advantages

- Reduces cut through traffic
- Reduces speeds and volume in immediate area
- May improve intersection safety by eliminating vehicular conflict points

Disadvantages

- Delays emergency vehicles
- Traffic diverted to adjacent streets may create new traffic problems
- Increased travel time and out of direction travel for local residents
- May increase u-turning movements and encourage wrong way travel

Effectiveness Scorecard

Speed	
Volume	
Cut-through	
Crashes	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	
Cost	$$$

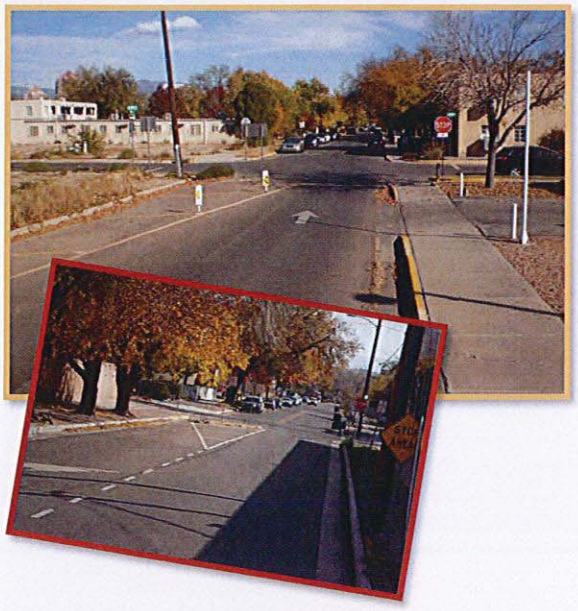
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO

Two-Street Conversions



DESCRIPTION:

Two-way street conversions involve changing the operation of a one way street to two way traffic. One-way couplets were historically established to provide greater capacity for traffic moving into and out of downtown areas. As travel patterns have changed and urban neighborhoods have become more established many cities are converting one-way couplets into two, two-way streets.

APPLICATION:

Two-way street conversions are most appropriate in areas where long established one-way couplets are no longer needed to accommodate the peak hour traffic demand or in areas where changing the character of the street is seen to have a positive neighborhood or economic development benefit. Two-way street conversions involve the reconstruction of traffic signals, signing, and striping.

Advantages

- May reduce vehicle speed
- May improve neighborhood character
- May create economic development opportunities

Disadvantages

- Introduces more vehicle, bicycle, and pedestrian conflicts
- Reduces through traffic capacity
- May impact bicycle lanes and parking

Effectiveness Scorecard

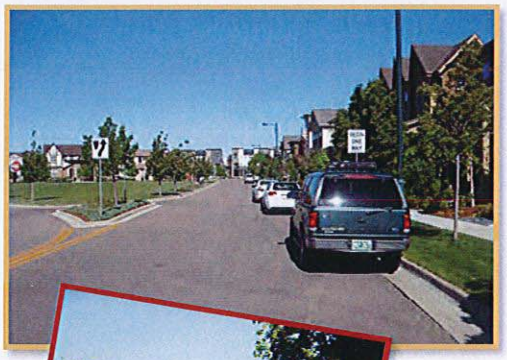
Speed	Good
Volume	Fair
Cut-through	Fair
Crashes	Fair
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Good
Noise	N/A
Cost	$$$$

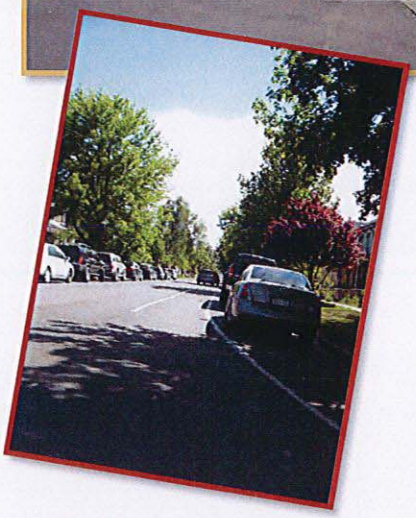
Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

SPEED LIMIT 25

One
Couplet Conversions





DESCRIPTION:

One-way couplets consist of a pair of parallel one-way streets that carry traffic in opposing directions. Couplets are established to provide greater capacity for automobiles particularly in areas with heavy peak directional demand. In a grid system, one-way couplets are often separated by a single city block, have fewer turning movements at intersections, and better synchronization of traffic signals.

APPLICATION:

One-way couplets are most appropriate for core urban areas with an established grid street system where the emphasis on mobility over land access is desired. Recognizing the need to maintain capacity for peak hour travel, this strategy is meant to manage rather than restrict or redirect vehicles. One-way couplets can be designed and configured to reduce the pedestrian crossing distances, establish bicycle lanes, and/or create needed on-street parking.

Advantages

- Higher automobile capacity than equivalent two-way streets
- May reduce pedestrian crossing distances
- Fewer intersection turning movements may increase safety
- Provides opportunities to create bicycle lanes and/or on-street parking

Disadvantages

- Without other traffic management strategies speeds may increase
- Delays emergency vehicles
- Increases travel time and out of direction travel for local residents

Effectiveness Scorecard

Speed	Poor
Volume	Fair
Cut-through	Fair
Crashes	Good
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Good
Noise	N/A
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

Quick Glance

CITY OF ALBUQUERQUE · 1706 · NEW MEXICO

MEMORANDUM

0217-1
6.3
1/14

Date: August 19, 2016

To: Transportation Commission

From: Mike Koperniak, Staff Liaison

Transportation Commission M. K.

Re: Continuation Of Developing A Traffic Calming Toolbox

Included in this agenda item are several items for review and consideration.

The first item is a draft process to generate a score for Community Interest. There was considerable discussion at the previous meeting regarding how to score negative support from residents living on blocks adjacent to the affected petition zone. This draft process assigns a points based on the petition and then subtracts points based on the extent of negative responses. As a consequence, the Community Interest score can vary between 5 and 15 points. The Commission should review this draft process and modify it if they see fit.

Another item is to review the attached draft table listing all six criteria and the scoring mechanism for each one. The Commission should confirm that the scoring mechanism for each criteria is what it decided on. It should be noted that for the Crash History criteria, there is a score gap for 4 or 5 crashes and 13 or 14 crashes. This should be addressed at tonight's meeting.

Another item for consideration is the test scoring table that was first presented at the June 27th meeting. This test scoring table applied the six criteria to four actual past petitions and generated scores ranging between 28 and 42 points out of a maximum 100 points. Although actual scores were generated, it still remains to be determined what constitutes an acceptable minimum score in order to proceed with applying the various traffic calming measures. The Commission needs to address this issue.

Staff questions that were presented at the May 23rd meeting but not all yet answered include:

1. The scores from the eight commutes appear to be relative scores by which the community can compare one petitioned for street versus another. Should the Village develop a base standard score for a "normal" street by which to compare petitioned for streets to? Petition scores falling at or below this base standard score would not be processed further.

2. It appears that the scoring for most of the communities does not distinguish between street mid-block traffic calming and street intersection traffic calming. Should the Village's scoring system distinguish between the two and use two different scoring systems?

3. answered

4. answered

5. answered

6. answered

It appears from reading through the eight NTMP reports that many of the communities use a two tiered system. The lower level utilizes easier to implement and less costly traffic calming measures while the upper level utilizes harder to implement and more costly traffic calming measures.

The next step after the Village's scoring and formulas have been developed is to consider if the Village should use a two tiered system.

0217-1
6.3
3/14

Traffic Control Options For Neighborhood Streets

(For use on two lane residential streets only)

Level 1 Traffic Control Measures

1. Speed limit signs
2. Special warning signs, i.e., not a thru street, children playing, no outlet, etc.
3. Speed warning program, i.e. notices sent to residents
4. Speed radar trailer
5. Intermittent speed enforcement activity by police
6. Improved intersection lighting

Level 2 Traffic Control Measures

1. Stop signs
2. Neighborhood speed watch program (see attached description)
3. On-street parking changes
4. Intense speed enforcement action by police
5. Pavement markings
6. Street narrowing (installed on a temporary and/or trial bases)

Threshold criteria for Level 2 Traffic Control Measures:

Speeds	- Average 24 hour speeds more than 2 mph over speed limit.
or	
Non-resident traffic	- At least 15% of traffic during problem hour found to be non-resident traffic

Level 3 Traffic Control Measures

1. Street closures
2. Street narrowing (permanent)
3. Traffic Diverters
4. One-way streets (with parking)
5. Traffic circles
6. Turn prohibitions
7. Speed humps (see attached criteria for use of speed humps)

Threshold criteria for Level 3 Traffic Control Measures:

Speeds	- Average 24 hour speeds more than 5 mph over speed limit.
or	
Non-resident traffic	- At least 25% of traffic during problem hour found to be non-resident traffic

D2

Note: 1. Non-resident traffic is defined as traffic not originating from or destined to a location within the neighborhood.
2. The use of "rumble strips" is not an approved traffic control devices.

Traffic Management Measures and Strategies			
	Albuquerque	Prince George's County	Oak Park
Non-physical	Non-physical strategies provide a non-invasive form of calming traffic that is inexpensive and easy to implement, and that can also be removed easily if the measure is unsuccessful. For these reasons, non-physical measures will be applied prior to implementing any physical traffic calming measures. Non-physical traffic calming strategies can take multiple forms.		
Physical	Physical strategies consist of physical changes in the roadway design for the purpose of reducing the average roadway speed (speed management) or daily traffic volume (volume management), improving the vehicle pedestrian design, or a combination of these elements. Physical strategies may be considered in instances where non-physical strategies have first been implemented, evaluated, and found to be unsuccessful.		
Level I		Measures are passive in nature and include educational methods and special pavement markings. For these measures to be implemented, they must be approved by a civic association. Residents may also be required to participate in implementation.	
Level II		Measures include traffic control devices and physical measures which control access to neighborhoods, change travel patterns, and regulate the flow of traffic through the neighborhood. Prior to implementation, a petition must be signed by the affected residents.	
Level III		Measures are used solely for the purpose of addressing severe through traffic problems. These measures should have the greatest detrimental impact on the residents of the neighborhood and should be considered only after all other measures have been shown to be ineffective. In addition to requiring a petition, level III measures require a public hearing to give the general public an opportunity to express their concerns. Due to the severe impact on travel patterns, Level III measures should not be considered on residential collector streets.	

EXHIBIT 3

Toolbox Summary

See detailed device pages for more information

Very Good · Good · Fair · Poor · Not Applicable

Effectiveness of traffic control measure at addressing concern

Traffic Management Strategy	Speed	Volume	Cut Through	Crashes	Emergency Vehicle	Pedestrian	Bicycle	Noise	Cost
Non-Physical Control Measures									
Targeted Police Enforcement	●	◔	◒	◒	●	●	●	N/A	$$
Radar Speed Trailer	◕	◔	◔	N/A	●	●	●	N/A	$$
Permanent Radar Speed Sign	◕	◔	◔	N/A	●	●	●	N/A	$$
Centerline / Edgeline / Laneline Striping	◒	◒	◔	N/A	●	●	●	N/A	$
Speed Reduction Markings	◒	◔	◔	N/A	●	●	●	N/A	$
Speed Limit Signage	◒	◔	◔	◒	●	●	●	N/A	$
Speed Limit Pavement Markings	◒	◔	◔	N/A	●	●	●	N/A	$
Raised Pavement Markers	◒	◔	◔	◒	●	●	◒	◔	$$
High Visibility Crosswalks	◒	◔	◔	◕	●	●	◕	N/A	$$
Parking Strategies	◒	◒	◒	◒	◒	◕	◒	N/A	$$
Education and Community Involvement	◒	◒	◒	◒	◒	◒	◒	◒	$
Signed Turn Restriction	◔	◕	◕	N/A	●	●	●	N/A	$
Speed Control – Narrowing Measures									
Neckdowns and Bulbouts	◕	◒	◒	◒	◒	◕	◒	N/A	$$
Lane Narrowing with Center Island /Pededstrian Refuge	◒	◔	◒	◒	◕	◕	◒	N/A	$$$
Two-Lane Choker	◒	◒	◒	◒	◕	N/A	◒	N/A	$$$
One-Lane Choker	●	●	●	◔	◔	N/A	◔	N/A	$$$
Roadside and Median Landscaping	◒	N/A	N/A	N/A	N/A	◒	◒	N/A	$$$
Road Narrowing / Detached Sidewalks	◕	N/A	N/A	N/A	◕	●	◒	N/A	$$$
Speed Control – Horizontal Measures									
Traffic Circle	●	◒	◒	◕	◒	◒	◒	◒	$$$
Roundabout (Single Lane)	◕	N/A	◔	●	◒	◕	◒	◕	$$$$
Chicane	◕	◒	◒	N/A	◕	◕	◒	◒	$$$
Lateral Shift	◒	N/A	◒	N/A	◕	◒	◒	N/A	$$$
Realigned Intersection	◕	◒	◒	N/A	◕	N/A	N/A	N/A	$$$
Medians and Partial Medians	◒	◒	◔	◒	◒	◒	◒	N/A	$$$
Speed Control – Vertical Measures									
Speed Hump	●	◕	◕	◒	◔	◕	◕	◔	$
Speed Table	●	◕	◕	◒	◔	◕	◕	◔	$
Speed Kidneys	●	◕	◕	◒	◕	◕	◕	◒	$
Raised Crosswalk	◕	◕	◕	◒	◔	◕	◕	◔	$
Raised Intersection	◕	N/A	N/A	◒	◔	●	◕	N/A	$$$
Volume Control Measures									
Full Closure (gate, midblock cul-de-sac, intersection cul-de-sac)	◕	◒	●	◒	◔	◕	◕	◕	$$$$
Partial Closure	◕	◒	●	◒	◒	◕	◕	◕	$$$$
Diagonal Diverter	◕	◒	●	◒	◒	◕	◕	◕	$$$$
Median Barrier	◒	◒	●	◕	◒	◕	◕	◕	$$$$
Forced Turn Island	◒	◒	●	◕	◒	◕	◕	◕	$$$
Two-Way Street Conversions	◕	◒	◒	◒	◕	◕	◕	N/A	$$$$
One-Way Couplet Conversions	◔	◒	◒	◕	◒	◕	◕	N/A	$$

August 22, 2016

Scoring Community Interest

The Public Interest score can vary between 5 and 15 points.

Scoring for Community Interest is determined by first calculating a base score of between 10 and 15 points as determined by the extent of positive public support within the affected petition zone and then subtracting between 1 and 5 points from this base score as determined by negative support from the adjacent area outside of the affected petition zone.

The first step is to calculate the base score based upon the extent of positive public support within the affected petition zone. Positive public support is indicated by a valid signature on the petition.

Valid petitions are petitions that have been signed by residents representing at least 51 percent (75 percent for cul-de-sacs) of the street frontage where the traffic regulations are being requested. The following tables show the scoring for 51% and 75% petitions.

51% petitions				
51%	-	59%	=	10 points
60%	-	68%	=	11
69%	-	77%	=	12
78%	-	86%	=	13
87%	-	95%	=	14
96%	-	100%	=	15

75% petitions				
75%	-	78%	=	10 points
79%	-	82%	=	11
83%	-	86%	=	12
87%	-	90%	=	13
91%	-	94%	=	14
95%	-	100%	=	15

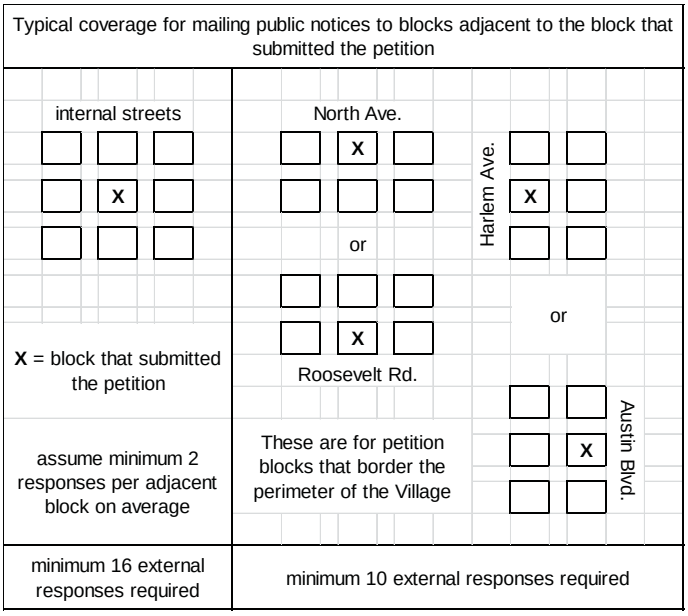
It is assumed that residents within the petition zone that have not signed the petition: (1) oppose the petition, (2) have no opinion on the petition, or (3) were not approached to sign the petition. In any case, these are to be considered as not positive support within the petition zone for the petition.

A valid petition receives a minimum score of 10 points for the fact that it is a valid petition. Additional points are assigned based upon the number of signatures. A maximum of 15 points is given to the base Community Interest score if there are signatures representing between 96% and 100% (95% and 100%) of the street frontage where the traffic regulations are being requested.

If written invitations to attend the public Transportation Commission meeting to give public testimony were not mailed to residents outside of the affected petition zone then the scoring process is complete and the final Community Interest score will range between 10 and 15 points. This is typically the case for stop sign petitions.

If written invitations to attend the public Transportation Commission meeting to give public testimony were mailed to residents outside of the petition zone, then the extent of negative support generated by these mailings needs to be determined and subtracted from the Community Interest base score.

Typically, when written invitations are mailed to residents outside of the petition zone, they are mailed to the blocks surrounding the petitioning block. Following are diagrams showing typical coverages for mailing public notices to blocks adjacent to the block that submitted the petition.



A minimum acceptable level of resident responses needs to be determined. For this purpose, assume that each adjacent block should generate at least one response per side of the street or two responses per block on average.

This number can vary based upon a decision by the Transportation Commission.

Resident responses include testimony received by Village Staff prior to the meeting as well as public testimony given during the meeting.

For petition blocks on internal streets, eight adjacent blocks will have been ma public notices. Requiring a minimum of 2 responses per block on average indicates that at least 16 responses will have to have been received in order to have an acceptable level of resident responses from residents outside of the affected petition zone.

For petition blocks that border the perimeter of the Village, five adjacent blocks will have been mailed public notices. Requiring a minimum of 2 responses per block on average indicates that at least 10 responses will have to have been received in order to have an acceptable level of resident responses from residents outside of the affected petition zone.

The percentage of negative support in these responses will be calculated and then negative points will be assigned based on the following table.

	% of negative replies				Subtract
Less than 10 or 16 replies				=	- 0 points
If at least 10 or 16 replies are received, subtract points based upon the percentage of replies that are negative	1%	-	20%	=	- 1 point
	21%	-	40%	=	- 2
	41%	-	60%	=	- 3
	61%	-	80%	=	- 4
	81%	-	100%	=	- 5 points

These points will be subtracted from the base score in order to arrive at a final Community Interest score.

Following is a scoring example.

A petition was submitted with signatures representing 81% of the street frontage where the traffic regulations are being requested. This would give a base score of 13 points.

Public notices were also mailed to the adjacent eight blocks. The Transportation Commission received back 19 responses from these adjacent blocks and 5 of them were negative. The 19 responses are more than the minimum required 16 responses. The 5 negative responses represent 26% of the 19 received responses. This 26% indicates that 2 points should be subtracted from the base score.

Therefore, the final Public Interest score would be 11 points (13 - 2).

It is mathematically possible that the final Public Interest score could be as low as 5 points. This would happen if the base score was at the minimum 10 points and the negative points were at the maximum 5 points. 10 points minus 5 points equals 5 points.

The end.

0217-1
6.3
10/14

<table>
<tr><th>Measure</th><th>Maximum Number of Points</th><th>Criteria Detail</th></tr>
<tr><td>Crash History</td><td>20</td><td>At least 3 correctible crashes in a 3 year period = 5 points
6-12 correctible crashes in a 3 year period = 10 points
more than 15 correctible crashes in a 3 year period = 15 points
any correctible crash involving injury to a pedestrian/cyclist = 5 points
how to score 4 or 5 crashes and 13 or 14 crashes?</td></tr>
<tr><td>Vehicle Speed</td><td>20</td><td>85th percentile speed is not over the speed limit = 0 points
85th percentile speed is 1 mph over the speed limit = 4 points
85th percentile speed is 2 mph over the speed limit = 8 points
85th percentile speed is 3 mph over the speed limit = 12 points
85th percentile speed is 4 mph over the speed limit = 16 points
85th percentile speed is 5 mph or more over the speed limit = 20 points
outlier excessive speeding = 5 points</td></tr>
<tr><td>Vehicle Volume</td><td>20</td><td>ADT < 750 = 0 points
ADT = 751 - 1,350 = 5 points
ADT = 1,351 - 1,950 = 10 points
ADT = 1,951 - 2,550 = 15 points
ADT > 2,550 = 20 points</td></tr>
<tr><td>Pedestrian Traffic Generators</td><td>15</td><td>Any school, park, library, church, CTA station 2 to 3 blocks (1,320 to 1,980 ft.) away = 3 points
Any school, park, library, church, CTA station one block (660 ft.) or less away = 5 points</td></tr>
<tr><td>Community Interest</td><td>15</td><td>Final Score = Base Score (+10 to +15 points) minus External Negative Support Score (-1 to -5 points)
Exteral Negative Score is from responses from outside of the affected petition zone.
<table>
<tr><th colspan="4">51% petitions</th></tr>
<tr><td>51%</td><td>-</td><td>59%</td><td>= 10 points</td></tr>
<tr><td>60%</td><td>-</td><td>68%</td><td>= 11</td></tr>
<tr><td>69%</td><td>-</td><td>77%</td><td>= 12</td></tr>
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<tr><td>96%</td><td>-</td><td>100%</td><td>= 15</td></tr>
</table>
<table>
<tr><th colspan="4">75% petitions</th></tr>
<tr><td>75%</td><td>-</td><td>78%</td><td>= 10 points</td></tr>
<tr><td>79%</td><td>-</td><td>82%</td><td>= 11</td></tr>
<tr><td>83%</td><td>-</td><td>86%</td><td>= 12</td></tr>
<tr><td>87%</td><td>-</td><td>90%</td><td>= 13</td></tr>
<tr><td>91%</td><td>-</td><td>94%</td><td>= 14</td></tr>
<tr><td>95%</td><td>-</td><td>100%</td><td>= 15</td></tr>
</table>
<table>
<tr><th colspan="4">% of negative replies</th><th>Subtract</th></tr>
<tr><td colspan="4">Less than 10 or 16 replies</td><td>= - 0 points</td></tr>
<tr><td rowspan="5">If at least 10 or 16 replies are received, subtract points based upon the percentage of replies that are negative</td><td>1%</td><td>-</td><td>20%</td><td>= - 1 point</td></tr>
<tr><td>21%</td><td>-</td><td>40%</td><td>= - 2</td></tr>
<tr><td>41%</td><td>-</td><td>60%</td><td>= - 3</td></tr>
<tr><td>61%</td><td>-</td><td>80%</td><td>= - 4</td></tr>
<tr><td>81%</td><td>-</td><td>100%</td><td>= - 5 points</td></tr>
</table></td></tr>
<tr><td>Bike Routes / Non-Bike Routes</td><td>10</td><td>Not identified as a proposed bike route/boulevard* = 3 points
Identified as an alternative bike route/boulevard* = 6 points
Identified as a bike route/boulevard* = 10 points
* Per the VOP Bike Plan 2008 or 2015 VOP Bike Plan Addendum</td></tr>
<tr><td>Maximum Score</td><td>100</td><td></td></tr>
</table>

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Measure	Maximum Number of Points	Criteria Detail	all-way STOP sign Columbian & Berkshire	traffic calming device on 1200 Woodbine	all-way STOP sign Randolph & Grove	all-way STOP sign Thomas & Lombard.
Crash History	20	At least 3 correctible crashes in a 3 year period = 5 points 6-12 correctible crashes in a 3 year period = 10 points more than 15 correctible crashes in a 3 year period = 15 points any correctible crash involving injury to a pedestrian/cyclist = 5 points	0	0	0	0
Vehicle Speed	20	85th percentile speed is not over the speed limit = 0 points 85th percentile speed is 1 mph over the speed limit = 4 points 85th percentile speed is 2 mph over the speed limit = 8 points 85th percentile speed is 3 mph over the speed limit = 12 points 85th percentile speed is 4 mph over the speed limit = 16 points 85th percentile speed is 5 mph or more over the speed limit = 20 points outlier excessive speeding = 5 points	12	20	4	8
Vehicle Volume	20	ADT < 750 = 0 points ADT = 751 - 1,350 = 5 points ADT = 1,351 - 1,950 = 10 points ADT = 1,951 - 2,550 = 15 points ADT > 2,550 = 20 points	5	5	20	5
Pedestrian Traffic Generators	15	Any school, park, library, church, CTA station 2 to 3 blocks away = 3 points Any school, park, library, church, CTA station one block or less away = 5 points	10	3	10	8
Community Support	15	Signatures only from blocks required for petition = 0 points Minor amount of signatures from neighboring blocks = 5 points Large number of signatures from other blocks, or signatures from agency/institution = 15 points	15	0	0	15
Bike Routes / Non-Bike Routes	10	Not identified as a proposed bike route/boulevard* = 0 points Identified as an alternative bike route/boulevard* = 5 points Identified as a bike route/boulevard* = 10 points * Per the VOP Bike Plan 2008 or 2015 VOP Bike Plan Addendum	0	0	0	10
Total	**100**		**42**	**28**	**34**	**46**

Are some or all of these scores high enough to warrant the implementation of traffic calming measures?

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APPROVED Meeting Minutes
Transportation Commission
Monday, August 22, 2016
Council Chambers – Village Hall

Call to Order and Roll Call

Chair Jack Chalabian called the meeting to order at 7:00 PM.

Present: Jack Chalabian, Kyle Eichenberger, Michael Stewart, Mark Patzloff, Will Gillespie

Excused: Joel Schoenmeyer, Craig Chesney

Staff: Mike Koperniak, Jill Juliano, Mary Avinger, Byron Kutz

There was no non-agenda public testimony.

Approval of Tonight's Meeting Agenda

Commissioner Gillespie motioned to approve the agenda as presented and was seconded by Commissioner Patzloff. The motion was approved by a unanimous voice vote.

Approval of the Draft June 27, 2016 Meeting Minutes

The Commission requested that page four of the draft minutes be modified to clarify that the numbers in paragraph six were related to scoring public interest.

Commissioner Stewart motioned to approve the draft June 27, 2016, Transportation Commission meeting minutes as modified and was seconded by Commissioner Patzloff. The motion was approved by a unanimous voice vote.

PETITION FOR ALL-WAY STOP SIGNS AT GROVE AND BERKSHIRE

Jill Juliano gave a presentation on the petition the Village received for all-way stop signs at Grove and Berkshire which included an overview of the petition and the reasons for submitting. The presentation included maps and outlining other traffic controls in the area including stop signs and where crossing guards are posted during arrival and dismissal times for Mann school. Jill spoke about the traffic study done on June 2nd this year to check the average speeds over a 24 hour period.

Commissioner Stewart asked if area was in a school speed zone and Jill responded no it wasn't.

crosswalks on all four approaches at Berkshire and Grove. The motion was second by Commissioner Eichenberger.

The voice vote was as follows:

Ayes: Chalabian, Gillespie, Patzloff, Eichenberger

Nays: Stewart

The motion passed four to one.

CONTINUED DEVELOPMENT OF A TRAFFIC CALMING TOOLBOX

Mike Koperniak gave a presentation on continuing the development of a traffic calming toolbox beginning with background information on the Commission's progress. The objective at the meeting is to review the draft scoring system developed in previous sessions compared to the petitions that have been submitted and reviewed by the Transportation Commission in recent years. The presentation went over the scoring points for each measure to see if the Commission wished to refine the points granted based on the particular measure.

A discussion took place about scoring for negative support, accepted level of resident response in and out of the petition zone, and various possible scenarios for scoring.

Mike Koperniak also went over the two scoring tables for 51% and 75% of signed petitions.

The discussion among the Commission then turned to Mike's table that broke down the criteria detail for each of the measures. The Commission discussed how to score crashes based on the minimum or maximum number of crashes. It was decided based on the number of crashes in 36 month periods that 1-3 crashes would earn 5 points, 4-6 crashes would earn 10 points, and 7 and above would earn a maximum of 15 points with an additional 5 points earned if a pedestrian or cyclist was involved in the crash. The Commission agreed the scoring for vehicle speed was okay.

Jill Juliano spoke briefly about data collected on streets for vehicle volume and how measurements are only for residential streets. The Commission continued discussing adjusting scoring for vehicle volume and felt numbers are too high for residential streets and that they should come back to this after looking at more data.

The Commission determined scoring for Pedestrian Traffic Generators and Bike Route/Non-Bike Routes were okay and the scoring for Community Interest was previously discussed.

Mike Koperniak continued the discussion looking over the scoring example for the all-way stop signs at Thomas and Lombard where the total points after scoring was 46.

Mike suggested when changing Crash History and rescoring other examples that scoring would change.

Commission Gillespie asked about the scoring example for the traffic calming device on the 1200 block of Woodbine and if churches, parks, and schools for example, were taken into consideration. Chair Chalabian responded about what is in the area and other scenarios in other parts of the Village including Highland and Roosevelt and a night club present on the Berwyn side. Mike Koperniak stated they can look at the Vehicle Volumes and will plug in the information at the next week.

Mike stated that the meeting in September will be on the Y2, Y3, and Y4 zone study and the Commission's work plan is due in October. The October meeting may be on the stop sign petition received for Monroe and Wenonah. Chair Chalabian suggested following up on the toolbox at the meeting in October to get it finished this year.

Commissioner Patzloff motioned to adjourn the meeting and the motion was seconded by Commissioner Stewart.

The voice vote was unanimous to adjourn the meeting.

The meeting was adjourned at 9:01 PM.

Respectively submitted

Mary Avinger

Mary Avinger,
Administrative Secretary

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Parking and Traffic Action Item Activity Summary

Grayed out row indicates the item has b
completed and closed

Project No.	Date Opened	Opened By	Date Closed	Petition mailed out on	Petition received on	Action Item Description	Name Address Phone Number	Commission Recommendation Village Board Action Final Disposition
1329	02/02/16	JAJ	08/17/16			Issues with parents driving in alleys to drop off students to Mann School		No Trans Com involvement necessary TWO 12485 written on 08/17/2016.
1330	02/05/16	JAJ				Request for convex mirrors at 319-325 N. Chicago Avenue		
1331	02/12/16	JAJ	03/03/16			Request for pedestrian crossing signs		No Trans Com involvement necessary
1332	02/23/16	JAJ	02/25/16			Speeding issues on 1100 block of Wisconsin Ave		No Trans Com involvement necessary Forwarded concerns to Enforcement
1333	02/23/16	JAJ				Concerns about speeding traffic by La Casa Montessori School (514 Adams St)		
1334	03/01/16	JAJ				Resident concern times Alcuin Montessori deploys barricades consistent with adopted resolution		No Trans Com involvement necessary
1335	03/08/16	JAJ	03/11/16			Resident request for SPEED LIMIT sign on 900 block of Linden		No Trans Com involvement necessary TWO #12425 & 12426 written on 03/09/2016
1336	03/10/16	JAJ				Resident concern regarding speeding vehicles on the 1150 block of S Kenilworth		
1337	03/21/16	JAJ	10/18/16			Speeding and volume concerns on Home Ave between South Blvd and Randolph St		No Trans Com involvement necessary TWO #12509 written on 10/31/2016 TWO # 12506 written on 10/18/2016
1338	03/30/16	MJK		03/31/16		Upgrade from 2-way to all-way STOP signs at Wesley & Fillmore		
1339	04/05/16	JAJ		04/05/16	05/10/16	Petition for STOP signs on Grove Avenue at Berkshire Street		VBOT directed staff to install temporary calming device, 6 months later collect data & bring back for review.
1340	04/11/16	MJK		04/11/16		Petition for STOP signs on Fair Oaks Avenue at Berkshire Street		
1341	04/21/16	JAJ		04/21/16	12/19/16	Petition for alley speed bumps in east-west alley south of North Ave west of East Ave		No Trans Com involvement necessary
1342	04/25/16	MJK		04/25/16		Petition for stop signs at Linden and Thomas		
1343	04/26/16	JAJ		04/29/16		Petition for STOP signs at Adams and Scoville		
1344	04/07/16	JAJ				Alley Issues due to delivery trucks at Jewel on Roosevelt Road		no Trans Com involvement necessary
1345	04/28/16	JAJ	07/22/16	04/30/16	05/23/16	Request for KKAD25 banners on 1100 / 1200 blocks of N Euclid		TWO #12470 & #12471 written on 07/22/2016
1346	05/23/16	JAJ				Request for memorial street sign for his daughter		
1347	05/23/16	JAJ				Request for convex mirror on end of alley		
1348	05/27/16	JAJ	10/22/16			Request for signal timings, crash data and traffic data for Madison St (part of Madison St Road Diet)		No Trans Com involvement necessary Data provided to KLOA.
1349	06/01/16	JAJ	08/03/16	06/01/16	06/02/16	Request for KKAD25 banners on the 900 block of N Lombard Ave		No Trans Com involvement necessary TWO #12479 written on 08/03/2016
1350	06/02/16	JAJ				Request for cul-de-sac on 1200 block of N Euclid (result of US Bank modifications)		
						Jackson Blvd Traffic Issues		No Trans Com involvement necessary

Parking and Traffic Action Item Activity Summary

Grayed out row indicates the item has b
completed and closed

Project No.	Date Opened	Opened By	Date Closed	Petition mailed out on	Petition received on	Action Item Description	Name Address Phone Number	Commission Recommendation Village Board Action Final Disposition
1351	06/03/16	JAJ	07/28/16			Jackson Blvd Traffic Issues (speeds & volumes)		Item completed by MJKoperniak RRFB equipment installed by VOP forces
1352	06/06/16	JAJ				Request for all-way STOP signs at intersection of Erie and Grove		
1353	06/09/16	JAJ				Request for cul-de-sac petition on the 1150 block of S Humphrey		
1354	06/20/16	JAJ		07/14/16		Petition for alley speed bumps in north-south alley north of Lake St east of Oak Park Ave		No Trans Com involvement necessary
1355	06/29/16	JAJ	07/05/16			Request for NO OUTLET sign on Rossell Ave at North Ave		No Trans Com involvement necessary TWO #12469 written on 07/05/2016
1356	07/06/16	JAJ				Request for traffic calming across Kenilworth medians between Division and North Ave		
1357	07/11/16	JAJ	10/31/16			Request for change in signage adjacent to 300 S Humphrey CDS		No Trans Com involvement necessary TWO #12510 written on 10/31/2016
1358	06/29/16	JAJ		07/13/16		Resident concerns about Marion/Erie intersection		
1359	07/14/16	JAJ		07/21/16		Requesting STOP signs at Berkshire & Grove		
1360	07/14/16	JAJ	10/05/16	07/15/16	09/08/16	Request for speed bumps in alley adjacent to Oak Park Ave & Jackson Blvd		no Trans Com involvement necessary TWO #12497 written on 10/05/2016
1361	07/15/16	JAJ				Concerns regarding Harlem/Ontario intersection.		
1362	07/28/16	JAJ				Data for consultant for North Ave report		No Trans Com involvement necessary
1363	07/29/16	JAJ				Issues with alley behind Lake St		No Trans Com involvement necessary
1364	08/01/16	JAJ				Traffic issues on Marion St south of South Blvd		
1365	08/04/16	JAJ	08/05/16			Request for existing traffic data on Oak Park Ave near residence		No Trans Com involvement necessary
1366	08/08/16	JAJ				Interested in traffic speed reduction options for 1100 block of Home Ave		
1367	08/23/16	JAJ		08/24/16	10/19/16	Reqeust for STOP signs at Harvey & LeMoyne		
1368	08/29/16	MJK		n/a		Resident request for flashing lights on Ridgeland at Ontario		
1369	08/31/16	MJK		08/31/16		request to install stop sign at Erie and Taylor		potential Trans Com item
1370	08/31/16	MJK				morning traffic controls at Madison and East caused by Fenwick trafficdeal with		
1371	09/01/16	JAJ				concerns about safety at Lombard & Superior (2 accidents in a week's time)		
1372	08/29/16	JAJ				parking and traffic issues on the 200 to 400 blocks of N Kenilworth		
1373	09/06/16	JAJ		09/23/16	10/19/16	Request for STOP sign petition for Forest /Greenfield intersection		

Parking and Traffic Action Item Activity Summary								Grayed out row indicates the item has b completed and closed
Project No.	Date Opened	Opened By	Date Closed	Petition mailed out on	Petition received on	Action Item Description	Name Address Phone Number	Commission Recommendation Village Board Action Final Disposition
						(near Lindberg Park)		
1374	09/06/16	JAJ				requesting multiple crosswalks / signage on Chicago between OPA & Ridgeland - for peds & OPRF kids		
1375	09/08/16	JAJ	09/08/16			Request for NO PARKING HERE TO CORNER signage at the NW corner of Division & Kenilworth		no Trans Com involvement necessary TWO # 12494 written on 09/08/2016
1376	09/07/16	JAJ		09/28/16		Request for all-way STOP signs at Home/Lexington intersection		
1377	09/09/16	JAJ				Request for STOP sign petition for Kenilworth/Greenfield intersection		
1378	09/09/16	JAJ				Request for speed bumps in alley		
1379	09/13/16	JAJ				Request for crosswalk on Ridgeland at Adams		
1380	09/14/16	JAJ				Request for enhanced safety at OPA/Van Buren crosswalk		
1381	09/14/16	JAJ		09/23/16	10/18/16	Petition for all-way STOP signs at East Ave & Division St intersection		
1382	09/21/16	JAJ				Request for additional SCHOOL ZONE signage at St Giles School		no Trans Com involvement necessary
1383	09/22/16	JAJ	09/22/16			Refresh crosswalk pavement markings at the Washington/Wisconsin intersection		no Trans Com involvement necessary SMO 30078 written on 09/22/2016
1384	09/21/16	JAJ				Reopening of Euclid/Harvard & Euclid/Fillmore STOP Sign petitions		formerly PF #1243 - no action in over 1 year.
1385	09/23/16	JAJ				Request for speed bump or cul-de-sac on 1150 block of Home Ave		
1386	09/27/16	MJK		09/27/16	10/06/16	requested stop sign petition for an unnamed location		
1387	09/29/16	JAJ		09/29/16		Request for speed bumps in the 1600 block of Austin alley		no Trans Com involvement necessary
1388	09/29/16	JAJ	10/04/16			Request for certain traffic control devices data for VBOT meeting		no Trans Com involvement necessary
1389	10/05/16	JAJ				Request for installation of crosswalk at an unnamed location.		no Trans Com involvement necessary
1390	10/10/16	JAJ	10/14/16			Request for safety information regarding red light cameras for discussions		no Trans Com involvement necessary replied to request on 10/14/2016
1391	10/12/16	JAJ				Request for traffic calming device on the 1200 block of Columbian Ave		
1392	10/12/16	JAJ				Request for cul-de-sac petition on the 1200 block of N Taylor		
1393	10/12/16	JAJ	10/12/16			Request for CROSS TRAFFIC DOES NOT STOP plaque on East Ave STOP signs at Division St		no Trans Com involvement necessary TWO #12503 written on 10/12/2016
1394	10/12/16	JAJ	10/24/16			Request for additional barricade to block off alley by Ascension School		no Trans Com involvement necessary Responded to request & provided options
1395	10/24/16	JAJ				Request for in-street pedestrian crossing signage on Washington at Kenilworth		no Trans Com involvement necessary

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Parking and Traffic Action Item Activity Summary								Grayed out row indicates the item has b completed and closed
Project No.	Date Opened	Opened By	Date Closed	Petition mailed out on	Petition received on	Action Item Description	Name Address Phone Number	Commission Recommendation Village Board Action Final Disposition
1396	10/21/16	JAJ				Issues with pedestrian push buttons in downtown Oak Park		no Trans Com involvement necessary
1397	10/21/16	JAJ				Concerns about Washington Blvd at Kenilworth intersection (vehicle & pedestrian interaction)		
1398	11/02/16	JAJ	11/10/16			Request for NO LEFT TURN sign for NB Maple St at Chicago Ave during holiday season		no Trans Com involvement necessary
1399	11/04/16	JAJ		11/04/16		Request for all-way STOP signs at Wesley & Fillmore		
1400	11/04/16	JAJ				Request for all-way STOP signs at Erie & Marion		
1401	11/09/16	JAJ		11/09/16		Petition for STOP signs at the intersection of Cuyler & Iowa		
1402	11/28/16	JAJ		11/29/16		Request for KKAD25 banners on block		no Trans Com involvement necessary
1403	11/29/16	JAJ		11/29/16		Request for alley speed bumps in adjacent north-south alley		no Trans Com involvement necessary
1404	12/01/16	MJK		12/01/16	01/30/17	request traffic calming device on 1200 Linden block		
1405	12/01/16	JAJ	12/02/16			Request for NO OUTLET sign on North Ave at Fair Oaks		no Trans Com involvement necessary TWO #12507 written on 12/02/2016
1406	12/15/16	JAJ	12/19/16			Resident complaint of back up of traffic on Chicago Ave at Ridgeland Ave intersection		no Trans Com involvement necessary Adjusted timing via Centracs, responded to residen
1407	12/29/16	JAJ				Request for signage to prohibit blocking of walkway		no Trans Com involvement necessary
1408	12/30/16	JAJ				Concern about North Blvd & Forest Ave intersection		no Trans Com involvement necessary
1409	12/30/16	JAJ	01/05/17			Request for warning signage for 1200 Woodbine speed table		no Trans Com involvement necessary TWO # 12514 written on 01/05/2017
1410	01/17/17	JAJ	02/08/17			Vehicle & pedestrian traffic data collection for the intersection of Jackson Blvd & Wesley Ave		no Trans Com involvement necessary Data provided to Village Engineer
1411	01/25/17	JAJ				Request for crosswalk markings on Chicago Ave at Grove Ave		no Trans Com involvement necessary
1412	02/01/17	JAJ	02/13/17			Issues with traffic in alley Marion to Forest 1 block N of Lake St		no Trans Com involvement necessary TWO #12534 was written on 02/13/2017
1413	02/03/17	JAJ				Request for in-street pedestrian crossing signs / crosswalk markings on Oak Park Ave at Erie St		
1414	02/06/17	JAJ				Request for BLIND PERSON warning signage		no Trans Com involvement necessary
1415	01/30/17	JAJ				Chicago/Ridgeland traffic signal timing is off since construction ended		no Trans Com involvement necessary