

**REPORT OF THE
VIRGINIA DEPARTMENT OF TRANSPORTATION**

TRAFFIC CALMING MEASURES

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



HOUSE DOCUMENT NO. 20

**COMMONWEALTH OF VIRGINIA
RICHMOND
1999**





COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, 23219

DAVID R. GEHR
COMMISSIONER

November 10, 1998

The Honorable James S. Gilmore, III
Members, Virginia General Assembly

Dear Governor Gilmore and General Assembly Members:

Pursuant to House Joint Resolution 229 of the 1998 General Assembly Session, I am enclosing the results of our efforts to study and initiate traffic calming in the Commonwealth of Virginia. The Department has prepared this pilot program to evaluate the impacts and effectiveness of the proposed guidelines addressing speeding on local residential streets.

Thank you for the opportunity to conduct this study. Upon completion of the pilot, we will implement the program statewide and promulgate the Residential Traffic Calming Guide to the counties, cities and towns.

As always, let me know if you have questions.

Very truly yours,

A handwritten signature in black ink that reads "David R. Gehr".

David R. Gehr
Commissioner

Enclosure

TABLE OF CONTENTS

PREFACE	iii
EXECUTIVE SUMMARY	v
INTRODUCTION	1
RESIDENTIAL TRAFFIC CALMING PROCESS	1
1. Board resolution	
2. Plan Development	
3. Approval and Implementation	
4. Evaluation	
TRAFFIC CALMING MEASURES	4
TRAFFIC VOLUMES AND TRAFFIC CALMING MEASURES	6
PHYSICAL DEVICES FOR TRAFFIC CALMING	6
1. Speed Hump	
2. Choker	
3. Raised Crosswalk	
4. Traffic Circle	
5. Crosswalk Refuge	
6. Chicane	
OPTIONS FOR COUNTIES	8
1. County-Specific Modifications	
2. Optional Point System for Prioritizing Projects	
FUNDING	9
APPENDIX A: COMMUNITY AWARENESS AND EDUCATION AND ENFORCEMENT	11
APPENDIX B: IMPLEMENTATION GUIDE FOR TRAFFIC CALMING DEVICES	19
APPENDIX C: HOUSE JOINT RESOLUTION No. 229	39

PREFACE

The Virginia Department of Transportation (VDOT) was asked by the 1998 General Assembly, through House Joint Resolution 229, to study traffic calming measures for high-density traffic areas. In conducting its study, the Department shall consider, but not necessarily be limited to: installation of speed bumps, establishment of one-way traffic patterns, division of through-streets into abutting cul-de-sacs, creation of four-way stop intersections, and reduction of speed limits. The Department shall solicit and consider comments and suggestions from local governments, planning districts, homeowners associations, and other community groups.

To best proceed the Department has developed the residential traffic calming guide that will be implemented as a two-year pilot program (January 1998 - December 1999). The purpose of the pilot program is to evaluate the impacts and effectiveness of the new guidelines to address speeding on local residential streets. A limited number of counties that have previously expressed an interest in traffic calming are participants in the pilot program. At the end of the pilot, the guidelines will be revised as needed, then implemented statewide as VDOT's official Residential Traffic Calming Guide.

VDOT's Residential Traffic Calming Committee Members:

Advisor	Mr. J. Lynwood Butner	State Traffic Engineer
Chairperson	Ms. E. O. Kastenhofer	Northern Virginia Traffic
	Mr. Q. D. Elliott	Williamsburg Residency
	Mr. B. H. Cottrell	Research Council
	Mr. E. D. Arnold	Research Council
	Mr. S. D. Edwards	Central Office Traffic
	Mr. H. C. Rasnick	Central Office Secondary Roads
	Mr. C. D. Hall	Central Office Traffic
	Mr. T. A. Bridewell	Richmond District
	Mr. J. R. Smith	Chesterfield Residency
	Ms. S. A. Larson	Fredericksburg District
	Mr. C. A. Kilpatrick	Fredericksburg Residency
	Mr. G. H. Gilbert	Central Office Traffic
	Ms. J. Morris	Northern Virginia Public Relations
	Ms. A.G. Tucker	Charlottesville Residency
	Mr. J. R. Vanlear	Verona Residency

Pilot Counties: Albemarle, Chesterfield, Hanover, Fairfax, Loudoun, Prince William, Spotsylvania and York

EXECUTIVE SUMMARY

The Virginia Department of Transportation (VDOT) was asked by the 1998 General Assembly, through House Joint Resolution 229, to study traffic calming measures for high-density traffic areas. The Department has developed the residential traffic calming guide that will be implemented as a two-year pilot program (January 1998 – December 1999). The purpose of the pilot program is to evaluate the impact and effectiveness of the new guidelines to address speeding on local residential streets. Pilot counties include Albemarle, Chesterfield, Hanover, Fairfax, Loudoun, Prince William, Spotsylvania and York.

Since the late 1980's, two statewide policies, addressing cut-through traffic and through truck traffic problems, have been available to help neighborhoods. VDOT has now developed a Residential Traffic Calming Guide, providing communities with a third traffic management tool dealing specifically with speeding on local streets. The purpose of traffic calming is to slow speeders in residential neighborhoods on streets classified as local. Traffic calming focuses on slowing traffic without restricting access.

The county board of supervisors initiates the traffic calming process by forwarding VDOT a resolution. Local residential streets are eligible for traffic calming provided the posted speed limit does not exceed 25 MPH. Also, the average speed must be at least 5 MPH over the posted speed limit and a petition requesting traffic calming must be signed by at least 75 percent of the total occupied households within the petition area.

The traffic calming plan should be developed by a group that includes representatives from the petition area, impacted area, homeowner associations, and board of supervisors, local transportation/planning staff, police, fire, rescue, VDOT, and others as appropriate. The board of supervisors and VDOT must jointly approve the final plan and method of implementation. A follow-up evaluation will be performed to insure the traffic calming measures are effective. The residential traffic calming guide is applicable to all counties. If a particular county believes that minor modifications are necessary to better serve the needs of its citizens, modifications may be requested.

Traffic calming measures include community awareness, education, enforcement, non-physical and physical devices. Physical devices include speed humps, chokers, raised crosswalks, traffic circles, crosswalk refuges and chicanes. Funding for measures is expected to be from revenue sharing and secondary road construction funds.

Recommendations at the end of the pilot period are to revise guidelines, as needed, then implement statewide as VDOT's official Residential Traffic Calming Guide.

RESIDENTIAL TRAFFIC CALMING GUIDE

A. INTRODUCTION

Since the late 1980s, two statewide policies, addressing cut-through traffic and through truck traffic problems, have been available to help neighborhoods. In 1997, VDOT developed a Residential Traffic Calming Guide, providing communities with a third traffic management tool dealing specifically with speeding on local streets. As in the policy on cut-through traffic, the county and VDOT are partners in addressing traffic calming, and the focus is on subdivision streets. The purpose of traffic calming is to slow speeders in residential neighborhoods on streets classified as local. Certain collector streets that have many of the characteristics of local residential streets may also qualify for traffic calming measures.

Traffic calming focuses on slowing traffic without restricting access. Neighborhoods do not qualify for cut-through traffic measures when the majority of the traffic and speeding are generated within the neighborhood. Traffic calming measures are appropriate for slowing traffic when cut-through traffic is not the problem.

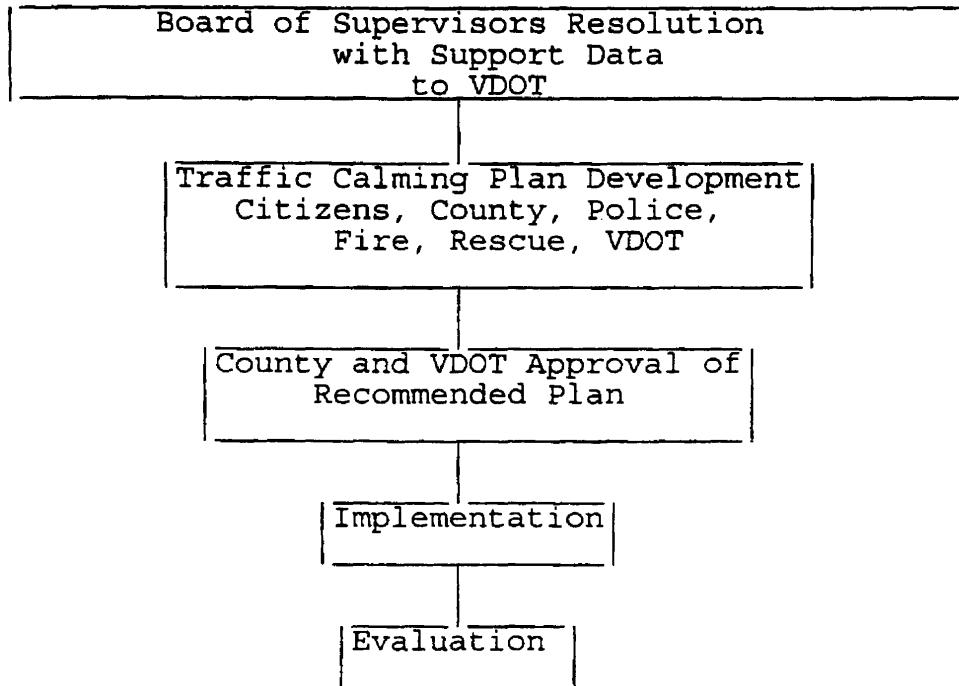
The county and VDOT will determine who is responsible for a particular task where the responsible agency is not specified. Similarly, within VDOT, the resident engineer and the district traffic engineer will determine how they will handle VDOT's role.

Although this guide is intended for existing streets only, there is concern about preventing traffic problems from developing on new subdivision streets. Therefore, before implementing this guide, a county should have a subdivision ordinance that has been approved by VDOT. The county should consider planning, enforcement, and transportation together in a comprehensive approach to managing residential traffic. In the subdivision design review process, VDOT should also exert its discretionary authority in applying geometric standards to discourage speeding and cut-through traffic.

B. THE RESIDENTIAL TRAFFIC CALMING PROCESS

Figure 1 depicts the steps in the traffic calming process.

Figure 1. Residential Traffic Calming Process



1. Board Resolution with Support Data Requirements

The board of supervisors initiates the traffic calming process by forwarding to VDOT a resolution that requests the initiation of a traffic calming project along with the following information:

- * street functional classification
- * average daily traffic volumes
- * average speed
- * description of petition area
- * description of impacted areas
- * petition with signatures.

The support data provided by the county should verify that the following requirements are met.

a. Eligible streets: Local residential streets are eligible for traffic calming provided the posted speed limit does not exceed 25 mph. A local residential street provides direct access to abutting residences and serves only to provide mobility within the neighborhood. Traffic on these streets is expected to be entering or exiting from the residences.

Certain residential collector streets, although classified as collector roads, have the characteristics of local residential streets. These streets may be considered for traffic calming measures if they meet the following conditions:

- * 25 mph posted speed limit
- * two-lane roadway
- * do not serve as the primary access to commercial or industrial sites
- * minimum of 12 dwellings fronting the street per 1,000 feet of roadway, including both sides.

Eligible streets are functionally classified as a local or collector street by VDOT.

b. Documented speeding problem: The average speed is at least 5 mph over the speed limit. Accordingly, the average speed should be at least 30 mph to qualify.

c. Petition for traffic calming: A petition requesting traffic calming and signed by at least 75 percent of the total occupied households within the petition area must be included. The petition area includes residences on the proposed study street section, and residences on all streets that have major access onto the proposed study street section. The county, in cooperation with VDOT, will define the petition area and provide a petition form. The impacted area typically includes the surrounding collector or arterial roads but should be defined by the county in cooperation with VDOT. The county will verify that the petition is valid.

The resolution and appropriate attachments should be sent to VDOT's local resident engineer, except in Fairfax and Prince William Counties, where the request should be sent to the District Traffic Engineer.

2. Plan Development

The traffic calming plan should be developed by a group that includes representatives from the petition area, impacted area, homeowner associations, the board of supervisors, local transportation/planning staff, police, fire, rescue, VDOT, and others as appropriate.

Because the impact of traffic calming measures will extend beyond the petition area, it is important to involve representatives from the larger, impacted area.

The board of supervisors and homeowner associations are responsible for scheduling and facilitating meetings. VDOT staff will provide technical support and advise the community of the potential advantages and disadvantages of calming measures. Educating participants about residential traffic management and

traffic calming is key to a successful program.

The proposed plan should be presented to citizens at a public meeting so that the board of supervisors can assess whether community support exists for the proposed measures. Other methods to assess support for the plan, such as a petition, may also be used.

3. Approval and Implementation

The final plan and method of implementation must be jointly approved by the board of supervisors and VDOT. The final plan must identify the source of funding for implementation.

4. Evaluation

A follow-up evaluation will be performed to ensure that the traffic calming measures are effective. The board of supervisors in cooperation with VDOT will determine the method to disseminate the findings and recommendations to those involved in the plan development and obtain feedback as appropriate.

If the county decides to remove the traffic calming devices, then funding for removal should be from the same funding sources as implementation. If an unforeseen safety problem develops, VDOT may decide to remove the traffic calming devices.

C. TRAFFIC CALMING MEASURES

Community awareness and education is an important first step. The residents should be made aware of the speeding concerns and should be reminded of the importance of driving safely in their neighborhood. VDOT staff is available to speak to homeowner associations about traffic calming measures and to help raise community awareness about advantages, disadvantages, costs, and funding options. See Appendix A for a sample brochure.

Enforcement is traditionally the primary means of addressing speeding problems. Local police officers monitor and enforce the posted speed limit. Enforcement efforts should be undertaken as much as possible prior to implementation of traffic calming measures. See Appendix A for more information on enforcement.

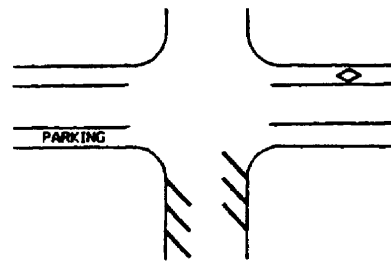
Non-physical devices are low-cost measures that do not physically restrict driver maneuvers, such as pavement markings to narrow travel lanes. (See Figure 2.)

Physical devices are designed to reduce speed by creating a vertical or horizontal shift in the roadway or travel lanes. (See Figure 2 and Section E.)

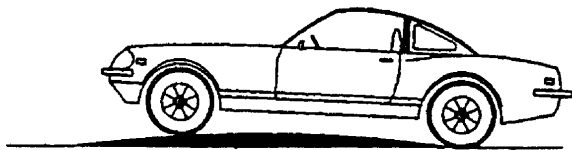


TYPICAL
TRAFFIC CALMING
DEVICES

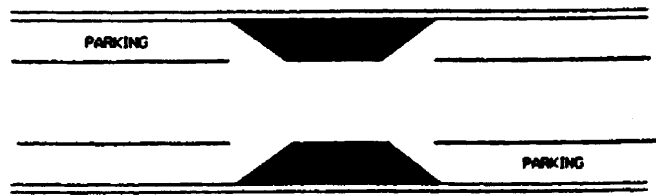
NON - PHYSICAL DEVICE



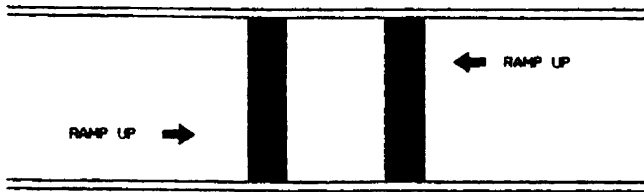
PAVEMENT MARKING/LANE NARROWING



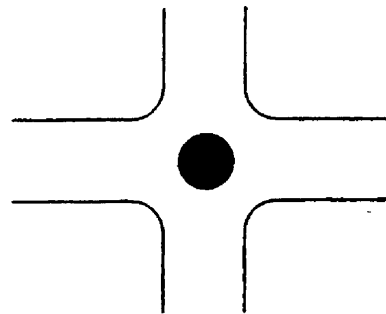
SPEED HUMP



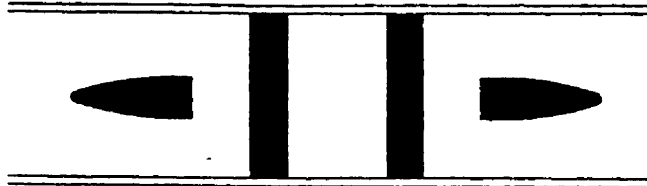
CHOKER



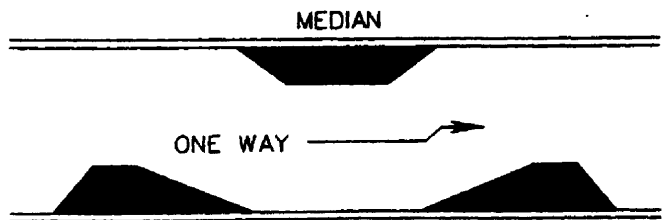
RAISED CROSSWALK



TRAFFIC CIRCLE



CROSSWALK REFUGE



CHICANE

FIGURE 2

Alternative actions should be considered when traffic volumes on the study street exceed 4,000 vehicles per day. A network analysis is suggested to thoroughly examine the road network in the area and identify potential improvements on major routes that may provide relief to the study street.

D. TRAFFIC VOLUMES AND TRAFFIC CALMING MEASURES

Traffic volumes on the residential street will determine the appropriate traffic calming measures as follows:

Fewer than 600 vehicles per day:

- education
- enforcement
- non-physical devices

600-4,000 vehicles per day:

- education
- enforcement
- non-physical devices
- physical devices

More than 4,000 vehicles per day:

- education
- enforcement
- alternative actions only
- no traffic calming devices

E. PHYSICAL DEVICES FOR TRAFFIC CALMING

The following devices have been effective in slowing traffic in neighborhoods. To ensure minimum delay in emergency response time, the installation of speed humps and raised crosswalks is discouraged on major emergency routes. Costs are provided only as rough estimates; actual construction costs will depend on the number of devices constructed, related signing and pavement markings, and the extent of aesthetic provisions. Physical devices are shown in Figure 2. More details are provided in the "Implementation Guide for Traffic Calming Devices" in Appendix B.

1. Speed Hump

Description: a raised hump in the roadway with a parabolic top, extending across the road at right angles to the traffic.

Placement: spacing should be about 500 feet, clearly visible for 200 feet, and placed at least 200 feet from intersections; should include warning signs.

Advantage: reduces speeds.

Disadvantages: increases emergency response times and slows emergency vehicles and buses, potential drainage problems, increases noise, increases maintenance costs.

Estimated cost: \$2,000-\$4,000 per speed hump.

2. Choker

Description: a physical constriction built at the curb side of the roadway to reduce the width of the travel lane.

Placement: normal turning radii should be accommodated; should include advance warning signs and delineation.

Advantages: reduces speeds, provides parking protection, shortens pedestrian crossing distance.

Disadvantages: potential drainage problems, maintenance costs.

Estimated cost: \$3,000-\$4,000 per pair.

3. Raised Crosswalk

Description: a raised hump in the roadway with a 10-foot flat top, extending across the road at right angles to the direction of traffic flow.

Placement: where significant number of pedestrians cross the roadway; should include advance warning signs.

Advantages: reduces speeds, provides improved visibility and safety for pedestrians.

Disadvantages: increases emergency response times and slows emergency vehicles and buses, potential drainage problems, increases noise, increases maintenance costs.

Estimated cost: \$2,000-\$4,000 per raised crosswalk.

4. Traffic Circle

Description: elevated area in the middle of the intersection that provides circular, counterclockwise traffic flow.

Placement: street grades approaching the intersection should not exceed 10 percent and entrances should be a minimum of 100 feet away on all approaches.

Advantages: reduces speeds, reduces left-turn accidents, can be visually attractive.

Disadvantages: placement of circle may reduce parking spaces and require additional right of way.

Estimated cost: \$2,000-\$6,000 per circle.

5. Crosswalk Refuge

Description: a raised median in the middle of the roadway with a cut provided for the crosswalk.

Placement: where a significant number of pedestrians cross the roadway.

Advantages: reduces speeds, provides refuge for pedestrians crossing roadway.

Disadvantages: increases maintenance costs.

Estimated cost: \$3,000-\$4,000 per crosswalk refuge.

6. Chicane

Description: alternating constrictions built curbside to create a bend in a formerly straight street, forcing vehicles to negotiate the narrowed street in a snake-like fashion.

Placement: should accommodate normal turning radii; sets are to be placed 400-600 feet apart; should include advance warning signing and delineation; used only on roadways divided with a median.

Advantages: reduces speeds, provides parking protection, shortens pedestrian crossing time and distance.

Disadvantages: limited to divided roadways, potential drainage problems, maintenance costs.

Estimated cost: \$4,000-\$5,000 per set.

F. OPTIONS FOR COUNTIES

1. County-Specific Modifications

The Residential Traffic Calming Guide is applicable to all counties. However, if a particular county believes that minor modifications are necessary to serve the needs of its citizens, modifications may be requested. The request should be addressed to VDOT's local resident engineer, except in Fairfax and Prince William counties, where the request should be addressed to the district traffic engineer.

2. Point System for Prioritizing Projects (Optional)

The point system in Table 1 was devised as an option for counties to use in prioritizing projects eligible for physical devices. The point system is based on speeds, volumes, and accident history. VDOT will work with the locality to help develop a county-specific method of prioritization.

Table 1. Optional Point System for Prioritizing Projects

Number of Speed-Related Accidents		Traffic Volumes		Speeds	
Points	Accidents/Year	Points	ADT	Points	Avg. Speed
1.0	1	0.5	600-1,000	1.0	30-34 mph
2.0	2	1.0	1,000-3,000	2.0	35-39 mph
3.0	3+	1.5	3,000-4,000	3.0	40+ mph

G. FUNDING

Traffic calming measures may be funded using one of the following:

1. 100 percent exclusively county-generated or other funds (no VDOT funding)
2. revenue sharing funds with 50 percent exclusively county-generated or other funds and 50 percent VDOT funds
3. secondary road construction funds; a maximum of 2 percent of the county's secondary road construction funds can be used with a three-year limit on its accumulation.

Maintenance will be funded through the county's VDOT secondary road maintenance funds. Implementation and maintenance of optional landscaping will be provided by the community.

APPENDIX A

COMMUNITY AWARENESS AND EDUCATION AND ENFORCEMENT

Community Awareness and Education

Many residential traffic management programs include a community awareness and education component. This component is performed alone, as a first step before deciding to consider other actions, or in combination with other actions. A brochure from Phoenix and a description of Portland's neighborhood speed watch program are on the following pages.

Enforcement

In addition to the traditional role of enforcing speed limits through issuing tickets, the police may also increase the community's awareness of speeding problems. Two examples are announcing locations for speed monitoring by radar through public service announcements (PSAs) and using a Speed Monitoring Awareness Radar Trailer (SMART). SMART is typically operated as an unstaffed trailer that uses radar to monitor speeds and a reader board to show drivers how fast they are going. An estimated cost of SMART is \$12,000-\$16,000. A PSA and a photograph of the SMART follows.



City of Phoenix

NEIGHBORHOOD TRAFFIC SAFETY



AS A DRIVER



Numerous studies in Phoenix have shown that a majority of motorists drive over the 25 mph speed limit on residential streets. These studies also show that those who exceed the speed limit come from all age groups, not just teenagers or commuters, but everyone alike.

What does this mean? The average motorist in Phoenix drives faster than they should on residential streets. Why does this occur?

- Local residents drive faster on their local streets because they feel familiar and comfortable.
- Outsiders use local streets as short cuts to busy arterial roads.

For children and the elderly, this can pose a special hazard.

HOW CAN YOU MAKE YOUR NEIGHBORHOOD STREETS SAFER?

DRIVE SLOWER

The maximum legal speed limit on residential streets is 25 mph (unless otherwise posted). Drive 25 mph or less to give yourself more time to react to the unexpected, such as a child darting out from behind a parked car. Unless you make a conscious effort, you may drive faster than you should on residential streets.

Remind neighbors to drive 25 mph. Make sure that others who use your vehicles drive 25 mph. Do not speed on major streets either, and avoid bad driving habits.

Studies show that driving at a lower and more responsible speed on residential streets, has very little effect on the time it takes to complete your journeys. Besides, **IT IS THE LAW.**

AVOID USING NEIGHBORHOOD STREETS AS SHORT CUTS

The more we use residential streets as short cuts, the more we disrupt the quality of life in neighborhoods. Neighborhood cut-through traffic increases noise and pollution in residential areas and results in a greater threat to the safety of children.

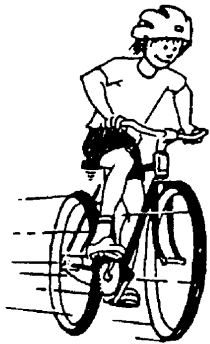
OBSERVE ALL THE RULES OF THE ROAD

Don't take chances, even on short trips. As statistics show, most accidents occur close to home. In particular, make sure you and all your passengers buckle up.

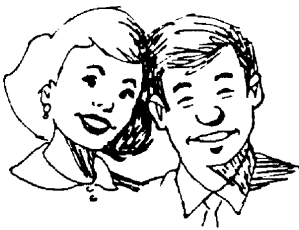
CHANGE YOUR DRIVING PATTERN ON RESIDENTIAL STREETS

Learn to adopt a different attitude! You should expect the unexpected on residential streets. It may not be your fault if you have an accident, but imagine the pain you would live with if you hit a child or elderly pedestrian. Yield to pedestrians. Pedestrians have the right-of-way at intersections whether crosswalks are painted on the street or not.

AS A PARENT



AS A RESIDENT



Ensure that your children know and understand the rules of the road. Our children are the primary pedestrians on residential streets and are the most likely victims of careless drivers.

Studies have shown that smaller children have difficulty in making safe judgments about traffic dangers. Do not let your children play in the street. Warn them against darting into the road after pets or toys. Teach your children to stop, look both ways, and listen before crossing streets. Make sure your children know that even though cars are supposed to stop, they may not.

SUPERVISE YOUR CHILDREN'S TRIPS TO AND FROM SCHOOL

- Plan a safe walking route to school. Walk it with your child and point out areas where they should be especially careful.
- Take or arrange for transport of smaller children to and from school.
- Set a good example, drive the speed limit and drive with courtesy. Let children off on the correct side of the road when delivering or picking them up from school.
- Ensure that your children are properly equipped to ride bicycles on city streets.
- You need to equip them with two things:
 1. Bright clothing and a safety helmet
 2. A sound understanding of the Rules of the Road.

DON'T RUSH!

Do not rush while driving. Be organized and leave a little earlier. In particular, do not rush getting children to and from school. Your urgency may cause them to disregard traffic safety and run headlong across the street.

BECOME BETTER INFORMED

Approach your Planning or Street Transportation Department for future plans for your street and area. Explore with them the different ways your street can be made safer and more livable. Discuss this information with your neighbors.

TAKE THE INITIATIVE

If there are potential problem areas along your street let your Street Transportation staff know, such as:

- Damaged or missing signs
- Pot-holes
- Landscaping that obscures a driver's vision of signs or intersections.

TALK WITH THE PHOENIX POLICE DEPARTMENT

Consistent traffic problems, particularly speeding, should be reported to your local police precinct. Let them know when the problem is more prevalent so they can conduct more effective enforcement. Ask for an occasional traffic patrol to deter speeders.

GET INVOLVED AND DO YOUR PART TO IMPROVE TRAFFIC SAFETY

THE PORTLAND NEIGHBORHOOD SPEED WATCH PROGRAM



Earl Blumenauer, Commissioner of Public Works
PORTLAND OFFICE OF TRANSPORTATION

BUREAU OF TRAFFIC MANAGEMENT

Goran G. Sparrman, Director
Lolita Allen, Speed Watch Program Coordinator

1120 S.W. 5th Avenue, Room 730
Portland, Oregon 97204-1969

Since
April 1990



A PUBLIC AWARENESS PROGRAM

PORTLAND OFFICE OF TRANSPORTATION
PORTLAND, OREGON
EARL BLUMENAUER, COMMISSIONER OF PUBLIC WORKS

THE PORTLAND NEIGHBORHOOD SPEED WATCH PROGRAM



Speeding drivers on residential streets is one of the most common complaints received by the Bureau of Traffic Management. The City's new **NEIGHBORHOOD SPEED WATCH PROGRAM** encourages neighborhood residents to become involved in addressing this problem.

NEIGHBORHOOD SPEED WATCH is a public awareness program in which concerned citizens can take an active role in solving the problem of speeders in their own neighborhoods. City residents record speeds and license numbers of cars travelling in excess of speed designations on neighborhood streets. Notification is sent from the City to the registered owners of those vehicles.

Often, drivers who speed through neighborhoods are unaware of the effect their actions have on the peace and safety of neighborhood streets. Notification from the City encourages drivers to slow down.

HOW THE PORTLAND SPEED WATCH PROGRAM WORKS

1. Citizens who wish to take part in this program notify the Bureau of Traffic Management, by phone or letter, expressing their interest in initiating a **NEIGHBORHOOD SPEED WATCH PROGRAM** in their neighborhood. **SPEED WATCH** efforts can be conducted on streets classified as "Local Service" streets and two-lane "Neighborhood Collector" streets in the City's Arterial Streets Classification Policy.
2. The Bureau of Traffic Management schedules the **SPEED WATCH** projects on a first-come first-served basis.
3. Approximately two days before the **SPEED WATCH** begins, a flyer from the citizen group is distributed throughout the neighborhood explaining the program and asking for cooperation in making it a success.
4. Citizens agreeing to participate in the program are briefed on the requirements expected of them. They are instructed in the use of radar equipment, proper data collection and appropriate behavior while conducting data collection. A radar unit is loaned out to the citizens.
5. Residents schedule data collection during the times they feel speeding to be at its worst. One person in the group is responsible for operating the radar unit. Another records the required vehicle information on a "Speeding Vehicle Report" form.
6. Once all data collection is complete, the neighborhood residents return the radar unit to the Bureau of Traffic Management along with all completed Speeding Vehicle Report forms.
7. License numbers of vehicles found to be speeding excessively are sent through the Department of Motor Vehicles' database and a list of registered owners and their addresses is compiled. The official description of the vehicle (received from DMV) will be cross-checked with the description of the vehicle given by the citizens.
8. A letter from the Bureau of Traffic Management is then sent to the registered owners of all matched vehicles. The letter advises them of the observed violation and asks them to encourage drivers of their vehicles to drive at or below the residential speed when traveling on neighborhood streets.

The **NEIGHBORHOOD SPEED WATCH PROGRAM** encourages safe and prudent driving by motorists traveling on neighborhood streets.

If you are interested in participating in the **NEIGHBORHOOD SPEED WATCH PROGRAM** or have questions, call the Bureau of Traffic Management at: **796-5185**.

PLEASE NOTE

This is a Public Awareness Program. The purpose is to inform speeding drivers of the neighborhood's concern for speeding. Registered owners of vehicles found speeding are not fined and no violation is cited on their driving record.

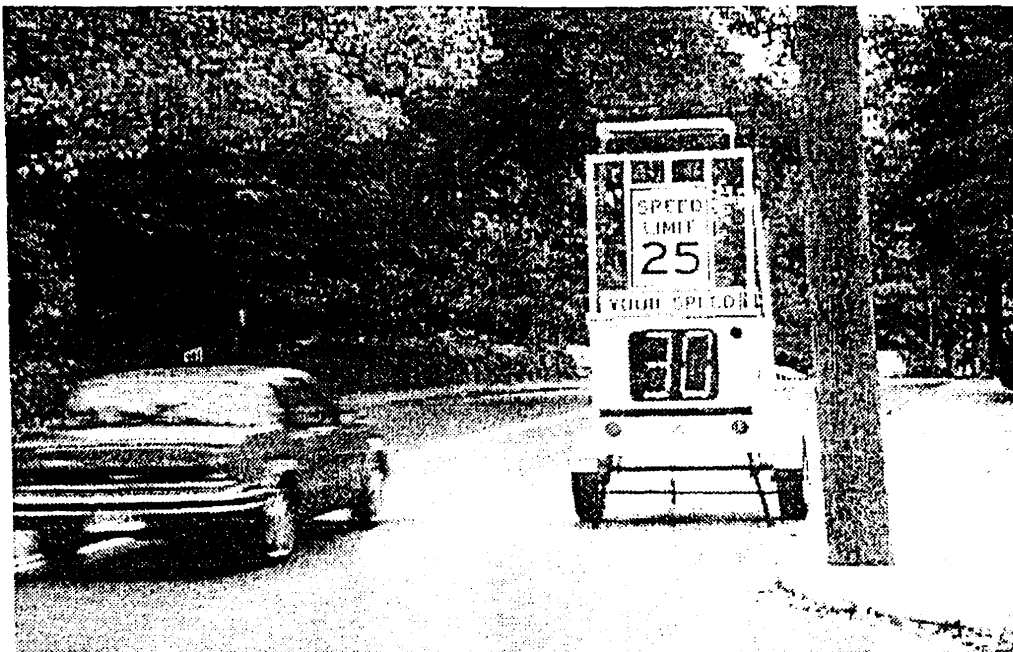


**Radar Locations
City of
Charlottesville**

*•Sgt. Ronald Roberts of the Traffic
Division announces the following
radar locations for the week are:*

**5th Street Extd.
Brandywine Drive
Cleveland Avenue
Ivy Road**

We can also be found on the
Internet at:
police@ci.charlottesville.va.us



APPENDIX B

IMPLEMENTATION GUIDE FOR TRAFFIC CALMING DEVICES

Chapter I	Introduction
Chapter II	Do's of Traffic Calming
Chapter III	Design and Installation
	A. Key Points with Design
	B. Design Aspects of Residential Traffic Calming Devices
	C. Do's of the Design Process
	D. Checklist for the Installation of Residential Traffic Calming Devices
Chapter IV	Residential Traffic Calming Devices
References	

Chapter I Introduction

The purpose of residential traffic management is to address traffic problems in residential neighborhoods. Traffic calming is intended to reduce speeds without restricting access. This "Implementation Guide for Traffic Calming Devices" will:

- o explain the difference between traffic control devices and traffic calming devices
- o give lessons learned in the planning process
- o list things to consider before and during device installation
- o show typical design standards and specifications.

Traffic control devices are frequently confused with traffic calming devices. Traffic control devices are signs, signals, and markings that are designed to regulate, warn, guide, and inform. Traffic calming devices are usually physical devices in the roadway used to slow traffic.

Although a traffic control device and a traffic calming device could share the goal of slowing motorists, the purpose of a traffic control device is to attempt to communicate, while the traffic calming measure is a part of the design of the street or intersection. A traffic control device may, however, supplement a traffic calming measure.

Chapter II Do's of Traffic Calming

1. Involve the community.
Do not develop or implement a plan without the community's involvement. No matter how technically sound a plan might be, it will not work as well if the community is not involved.
2. Educate decisionmakers.
Avoid uninformed (often political or emotional) decisions.
3. Look at the arterial network first.
No one uses a short-cut unless there's a reason to. The reason is often congestion on nearby arterials.
4. Favor self-enforcing measures.
"Self-enforcing" measures maintain a 24-hour presence and are effective without police enforcement.
5. Consult with all services.
Police, fire, ambulance, transit, sanitation services, and snow plow operators should be involved from the beginning.
6. Sign and delineate.
Install appropriate warning signs, and delineate the traffic calming devices.
7. Implement measures on an areawide basis.
Avoid creating more problems or relocating a problem. Always consider the impacts on adjacent local streets and arterial roads. Identify groups of measures to be implemented in stages if funding for the entire transportation management plan cannot be secured at once.
8. Monitor and follow-up.
Report back to the community as to the success of traffic calming devices. This helps to justify additional expenditures and enhances the credibility of the traffic management program.

Implement measures as demonstrations if decided by consensus.
9. Quantify the problem.
Identify the real problem(s). Speed, volume and noise are frequent complaints, but often the real problem on a street is just one of these.

Undertake traffic counts, speed studies, and accident

data analyses.

Remember that you are hearing mostly from people who are dissatisfied. There are other aspects to the situation that you are not likely hearing about.

10. Remember that everybody drives differently.
Some people will drive around or over some calming devices. Some people don't understand traffic circles, no matter how well they are signed.

Some people resist change.

11. Expect problems.
Some problems (such as regional traffic issues) cannot be addressed by a neighborhoodwide plan.

Some problems cannot be resolved at a reasonable cost. For example, it may simply be too expensive to acquire property to widen an intersection or a road.

Refer other problems to the appropriate agency, such as the planning department, the police, etc.

Chapter III Design and Installation

A. Key Points with Design

Some designers appear to focus solely on traffic calming measures rather than using traditional traffic management and traffic calming measures in combination.

Speed humps are an effective means of speed reduction but are often opposed by bus operators and emergency services. In some situations, it should be possible to achieve a sufficiently effective scheme without the need for vertical deflections.

While speed humps slow traffic, they can attract criticism because of the inconvenience, discomfort, and vehicle damage.

Narrowing travel lanes can be very effective, particularly when the two-way traffic volume is high. Lanes need adequate signing and marking.

If systematic monitoring takes place, it will be easier to decide which measures are appropriate for different circumstances.

B. Design Aspects of Residential Traffic Calming Devices

Visibility. Devices should be clearly visible day and night. Reflectors, buttons, highly reflective paint, or illumination should be used as appropriate to ensure visibility. Additionally, traffic calming devices should not be placed where drivers do not have adequate stopping sight distance for the operating speed of the road.

Signing. Advance signs should warn motorists of upcoming traffic calming devices and, to the extent possible, guide the motorists' response to such devices.

Streetscape. Traffic calming devices should blend naturally with the streetscape and enhance the appearance and feel of the street. They should alert drivers that they are in or entering a residential place.

Design vehicles. Traffic calming devices should be designed to accommodate emergency service and other large vehicles at an acceptable speed.

Maintenance. Long-term maintenance needs should be anticipated in the design process and minimized to the extent

possible. Some jurisdictions contract with the neighborhood to maintain plantings or simply eliminate landscaping in the absence of a willingness on the part of residents to participate.

Parking. On-street parking in residential areas creates a sense of activity; some jurisdictions encourage on-street parking for this reason. However, in some instances, on-street parking also creates sight line restrictions, which may be unsafe for drivers who are speeding.

Speed control. Traffic calming devices should be located and designed to limit speeds in residential areas.

C. Do's of the Design Process

1. Consider installing temporary traffic calming devices and monitor them for a period of time before installing the permanent devices.
2. Have an organized program including public involvement with plans and policies approved and supported by the local government.
3. Involve the local service agencies, including fire, police, and emergency medical service personnel, from the beginning.
4. Consult with fire department and EMS personnel to develop the design, particularly with speed humps and traffic circles. Set up traffic circles with cones and have the fire trucks and other emergency vehicles drive around them. This will help determine what radius is best for the types of emergency vehicles found in different areas. The same process can be used in the design of speed humps.
5. Review traffic patterns in the neighborhood as a whole. Avoid solving the problem on one neighborhood street by shifting the traffic to another neighborhood street.
6. Make certain that all signing and channelization are in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), the Supplement to the MUTCD, and the AASHTO Policy on Geometric Design of Highways and Streets.
7. Check sight distances for vehicles, pedestrians, and bicyclists. Sight distance is to meet the requirements of the AASHTO Policy on Geometric Design of Highways and Streets.

8. Check sight distances by visiting the site before and after installation. Do parked cars obstruct sight distances? Does landscaping (now or after it grows) or other features obstruct sight distance?
9. Review the on-street parking. Will parked cars block access of emergency vehicles through or around the proposed neighborhood traffic calming devices? Add additional no parking zones where needed.
10. Review the site for utility conflicts. Is there a fire hydrant? Does it need to be moved? Are there utilities in the way?
11. Check the stormwater drainage. Will the storm drain system need to be moved or revised? Can the runoff get through or around the device?
12. When installing traffic calming devices on streets without curbs, supplemental features (e.g., bollards, delineators) may be necessary to keep vehicles within the traveled way.
13. Traffic calming devices may need to be adjusted on streets with grades of greater than 10 percent.
14. Traffic calming devices should be installed on curving, winding roads with limited sight distance only if reduced speed limits and adequate warning signs are used in conjunction with the devices.
15. Traffic calming devices should be away from driveways.

**D. Checklist for the Installation of
Residential Traffic Calming Devices**

As a minimum, the following items should be reviewed by the design professional for each residential traffic calming device installation:

Geometrics

Turning radius
Horizontal and vertical alignment
Superelevation
Major geometric features such as sidewalks,
curbs, etc.
Roadway width
Sight distances

Safety

Channelization
Illumination
Signing
Safety zone (clearance of obstructions from
traveled roadway)
Crosswalk locations

Utilities

Water and sewer
Franchise utilities (such as gas, power,
telephone, etc.)
Storm drainage
Location of fire hydrants

Design vehicles

Local emergency vehicle characteristics
Minimum design vehicle - bus, single-unit
truck, or passenger car
Public transit and school bus stops and routes
Bicycles and wheelchairs

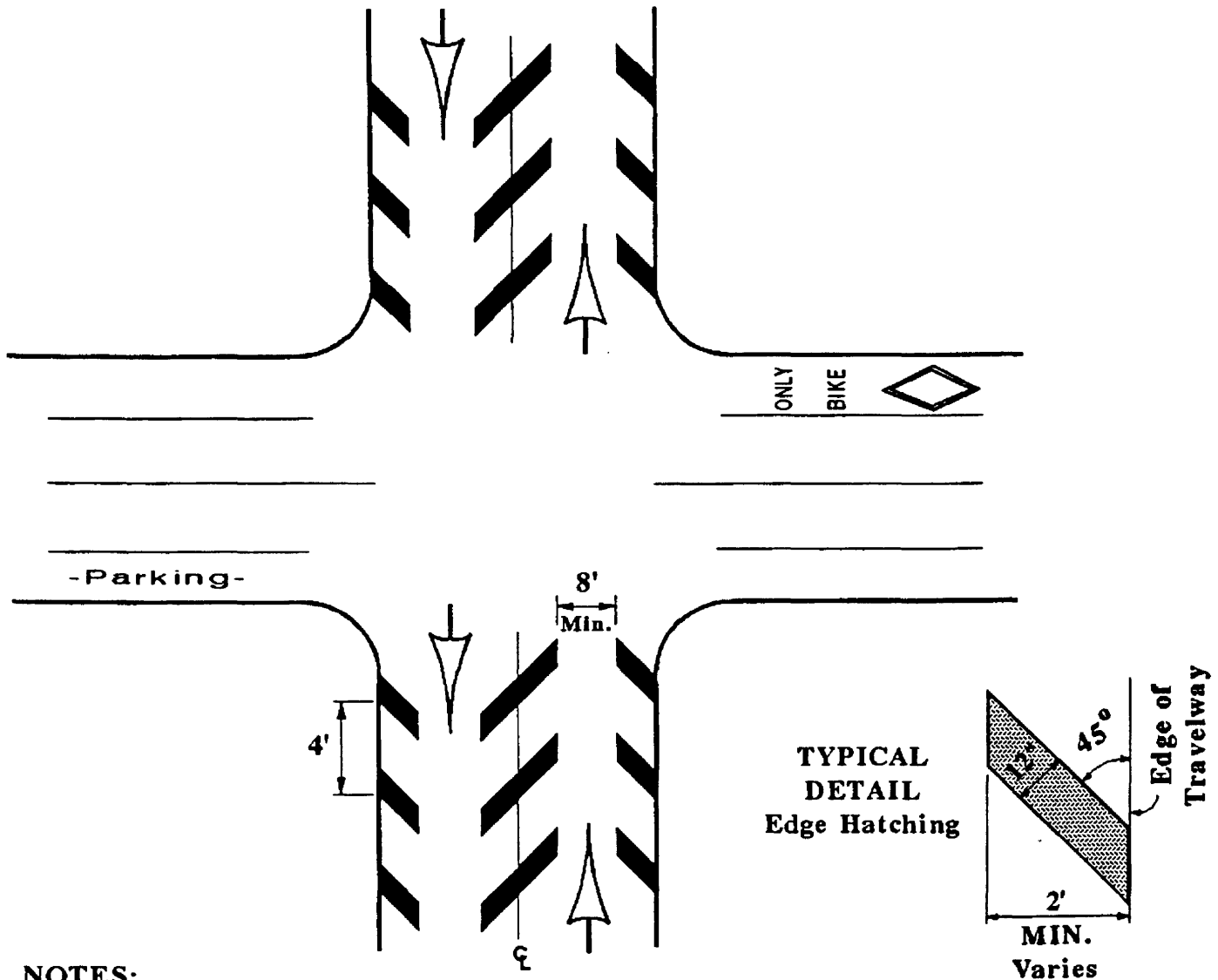
Other

Landscaping
Pedestrians and bicycles
Handicapped access
Parking
Mail delivery routes
Emergency access

Chapter IV
Residential Traffic Calming Devices

TRAFFIC CALMING DEVICE

Figure B-1. NON-PHYSICAL DEVICE PAVEMENT MARKING / LANE NARROWING

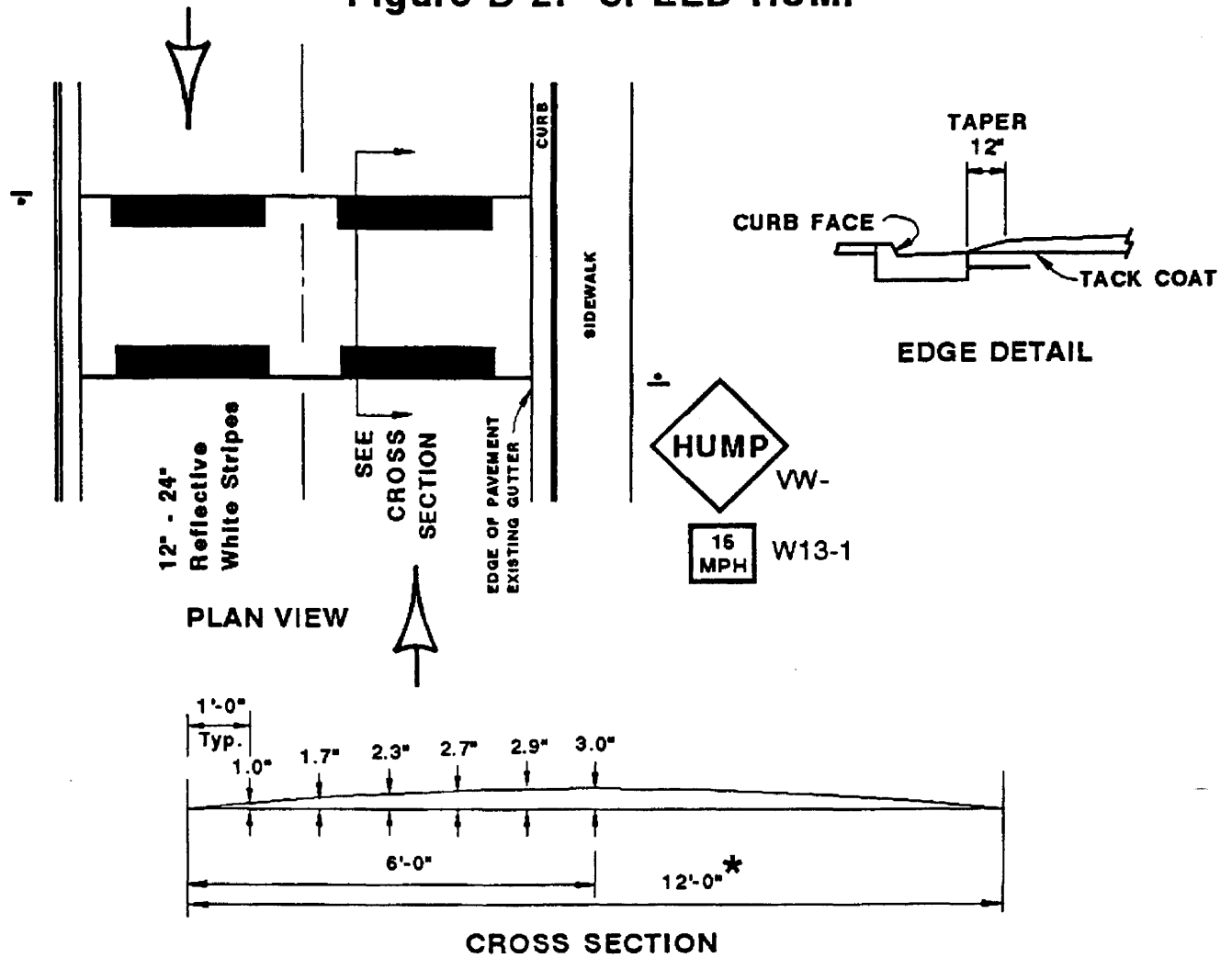


NOTES:

- 1) Markings shall be in accordance with the M.U.T.C.D. and VDOT's Road and Bridge Standards and Specification manuals.
- 2) Narrowing Design Options:
 - a) Hatching
 - b) Parking Lanes
 - c) Bike Lanes
- 3) The amount of hatching as well as widths, lengths and spacing to be determined by the Engineer. Centerline hatching optional.
- 4) Travel lanes not to be less than 8' in width.
- 5) Engineer to modify design to accommodate field conditions while conforming to AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-2. SPEED HUMPH

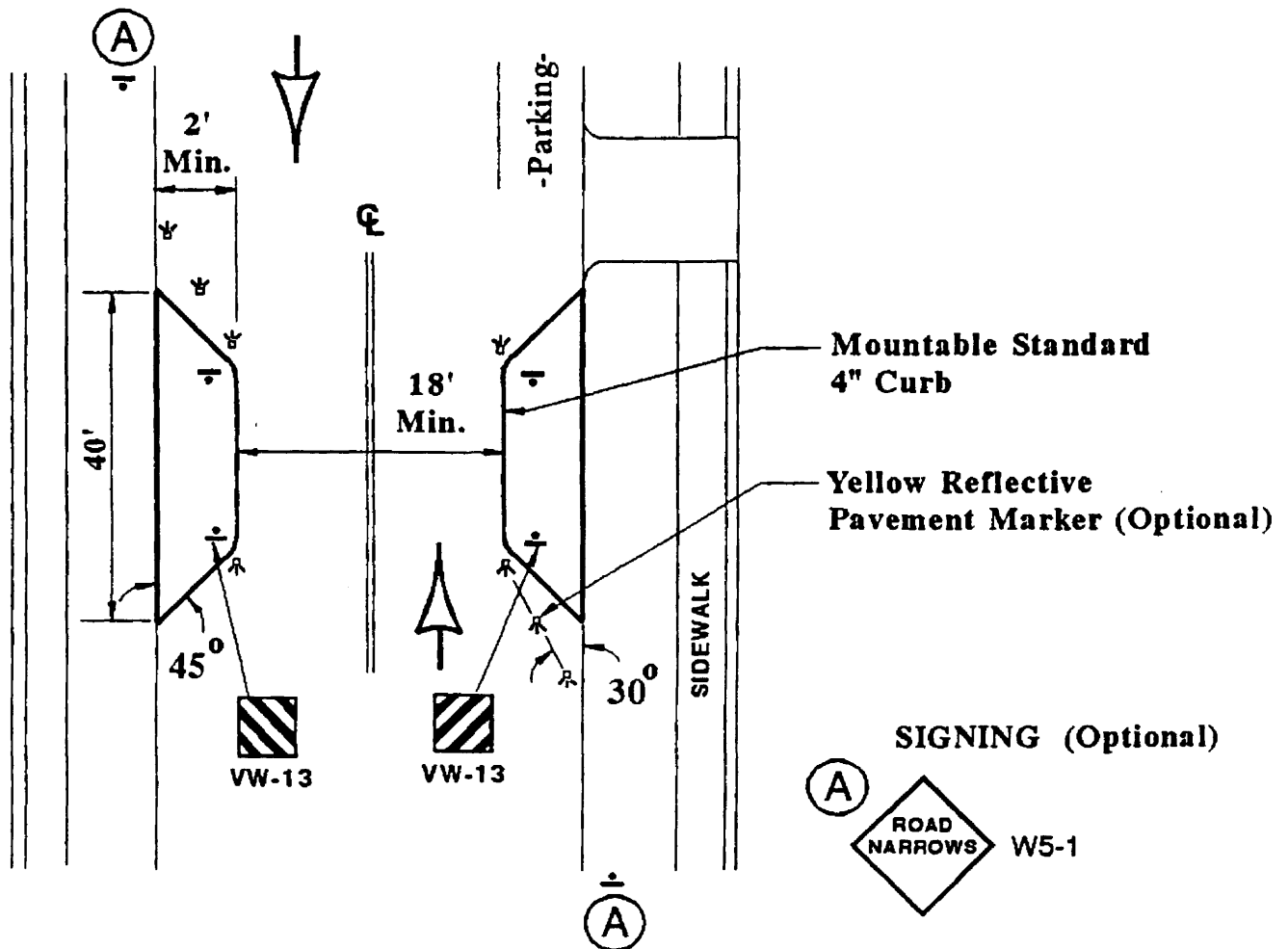


NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Advance signing, at each location, optional when part of an area wide scheme.
- 3) Cross-section shows approximate elevation for 3" (maximum) speed hump.
- 4) Design Options:
 - a) 22' section (*) See Raised Crosswalk for cross-section.
- 5) Speed Humps shall not be placed over manholes, watergates, junction chambers, etc.
- 6) Speed Humps must be placed at locations approved by Engineer.
- 7) Engineer to modify design and location to accommodate field conditions (ex. drainage) while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-3. CHOKER

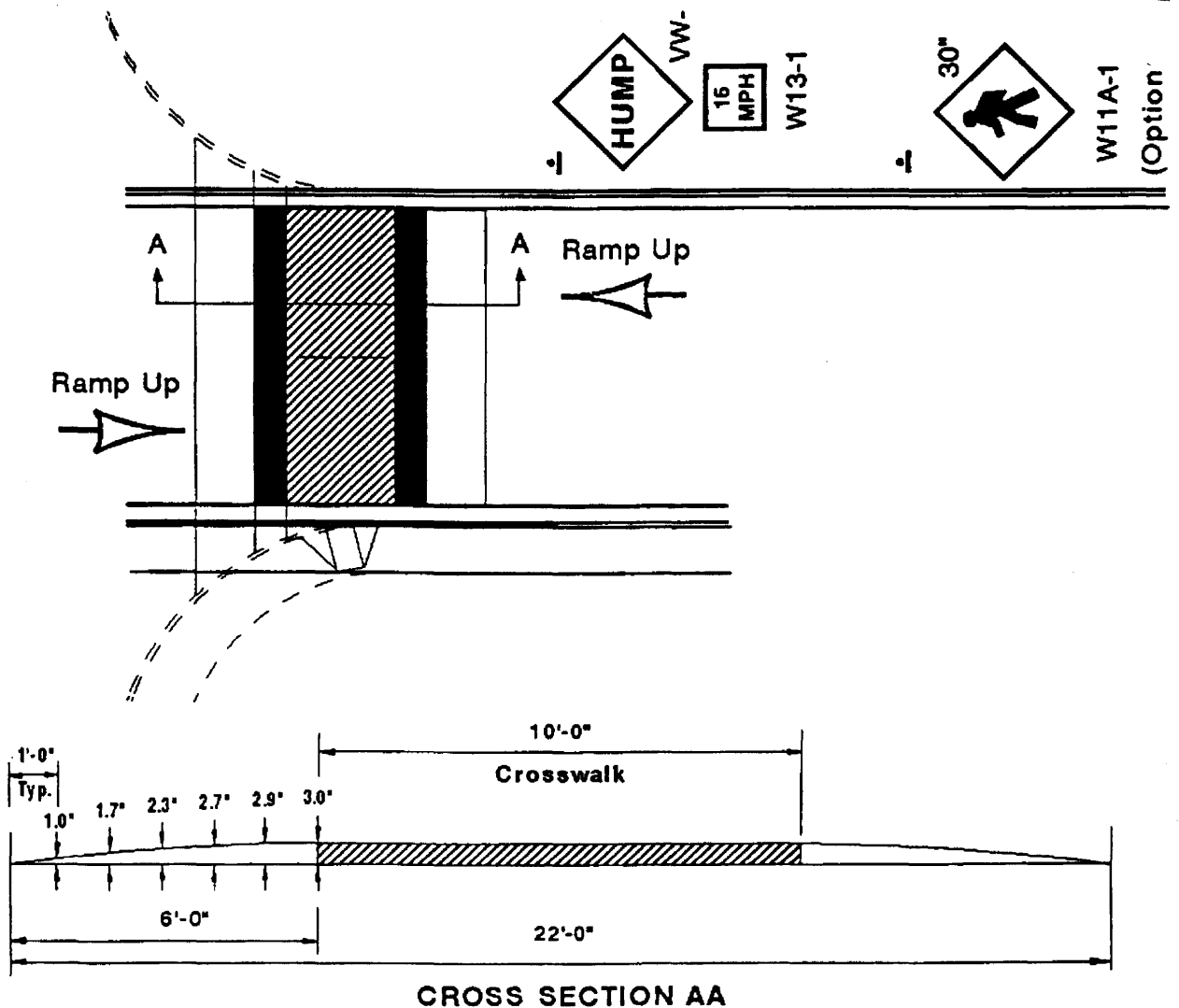


NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Advance signing, at each location, optional when part of an area wide scheme.
- 3) Landscaping designs, if any, to be determined by the community and approved by the Engineer.
- 4) Design Options:
 - a) Intersection of Mid-block
 - b) One-side or Two-side
 - c) Combined with Raised Crosswalk
- 5) Engineer to modify design and location to accommodate field conditions (ex. drainage) while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-4. RAISED CROSSWALK

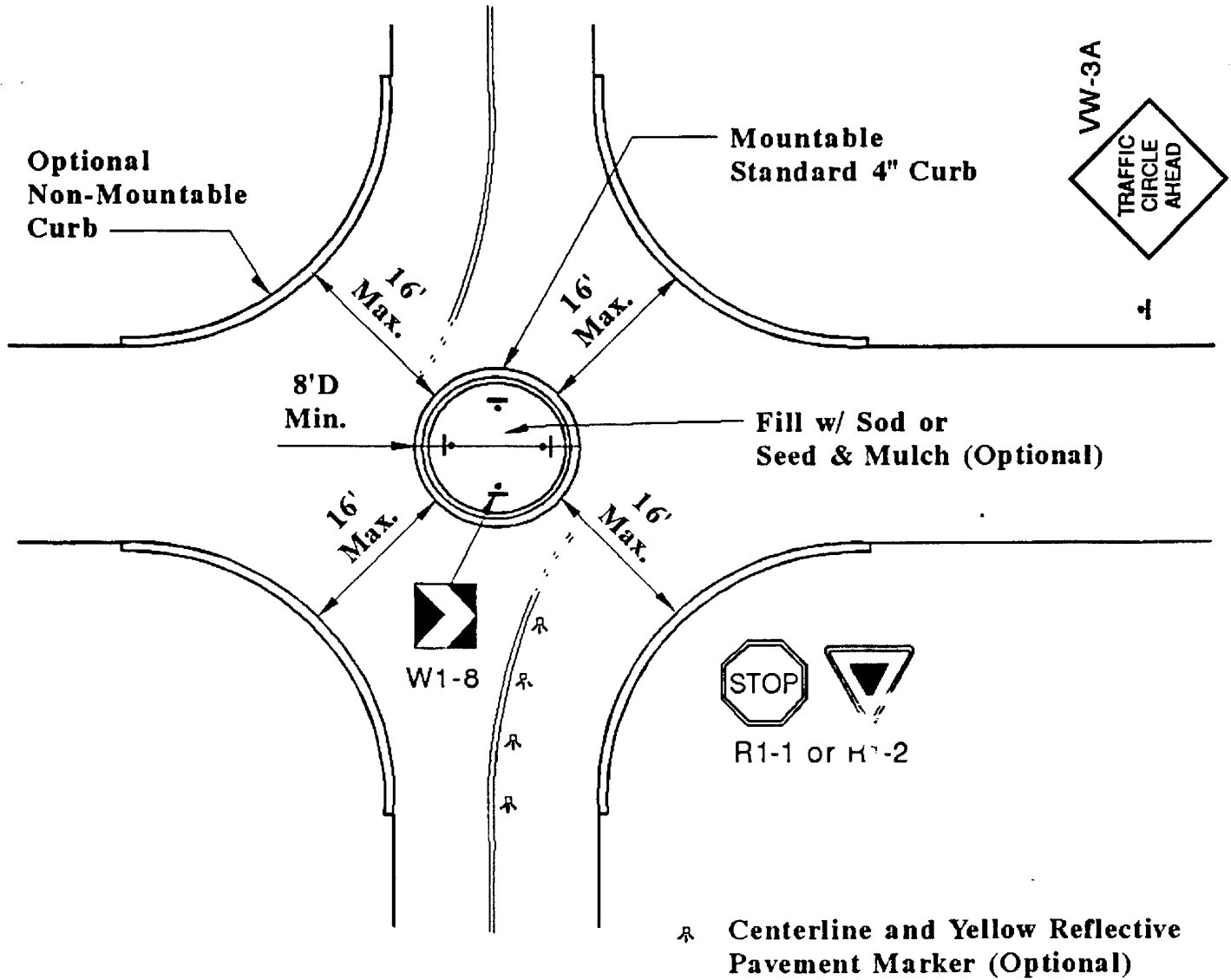


NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Cross-section shows approximate elevation for 3" (maximum) raised crosswalk.
- 3) Design Options:
 - a) Intersection or Mid-block
 - b) Combined with Choker
- 4) Raised Crosswalks shall not be placed over manholes, watergates, junction chambers, etc.
- 5) Raised Crosswalk material and placement to be approved by Engineer.
- 6) Engineer to modify design to accommodate field conditions (ex. drainage and curb cuts) while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-5. TRAFFIC CIRCLE

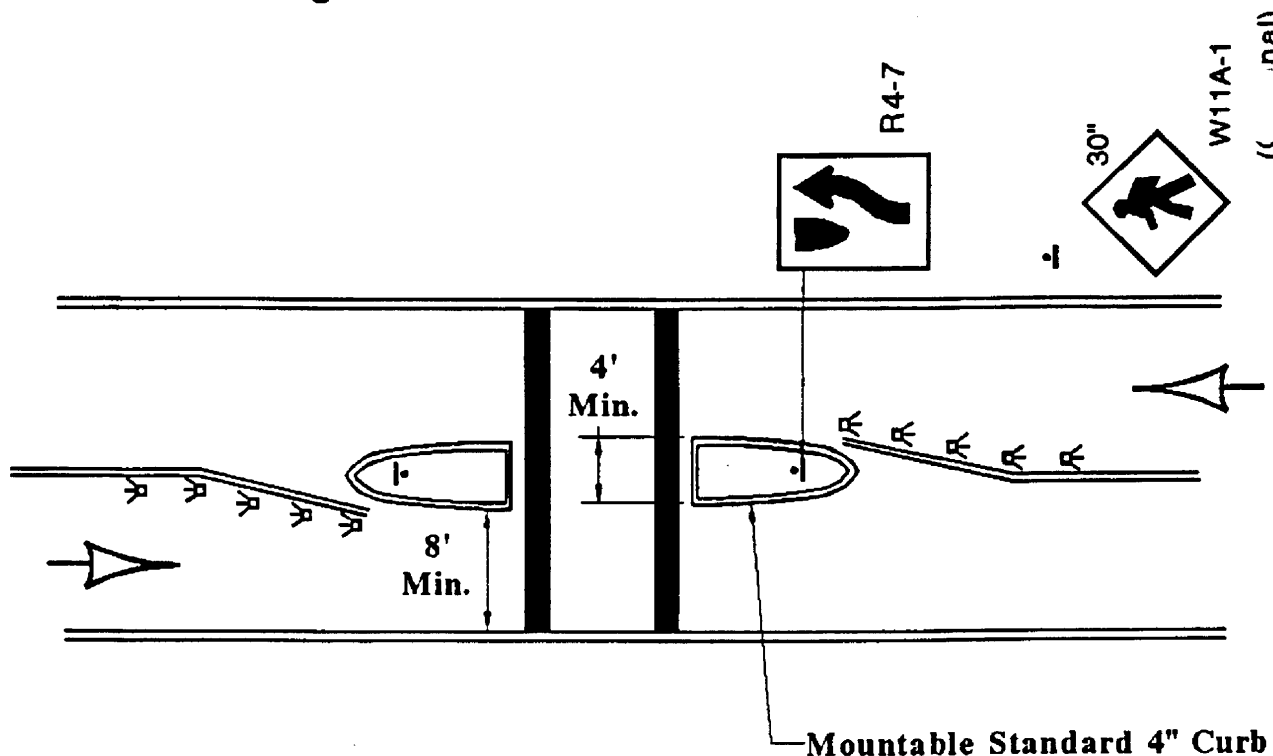


NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Landscaping designs, if any, to be determined by the community and approved by the Engineer.
- 3) Engineer to modify design to accommodate field conditions (ex. drainage) and available ROW while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-6. CROSSWALK REFUGE



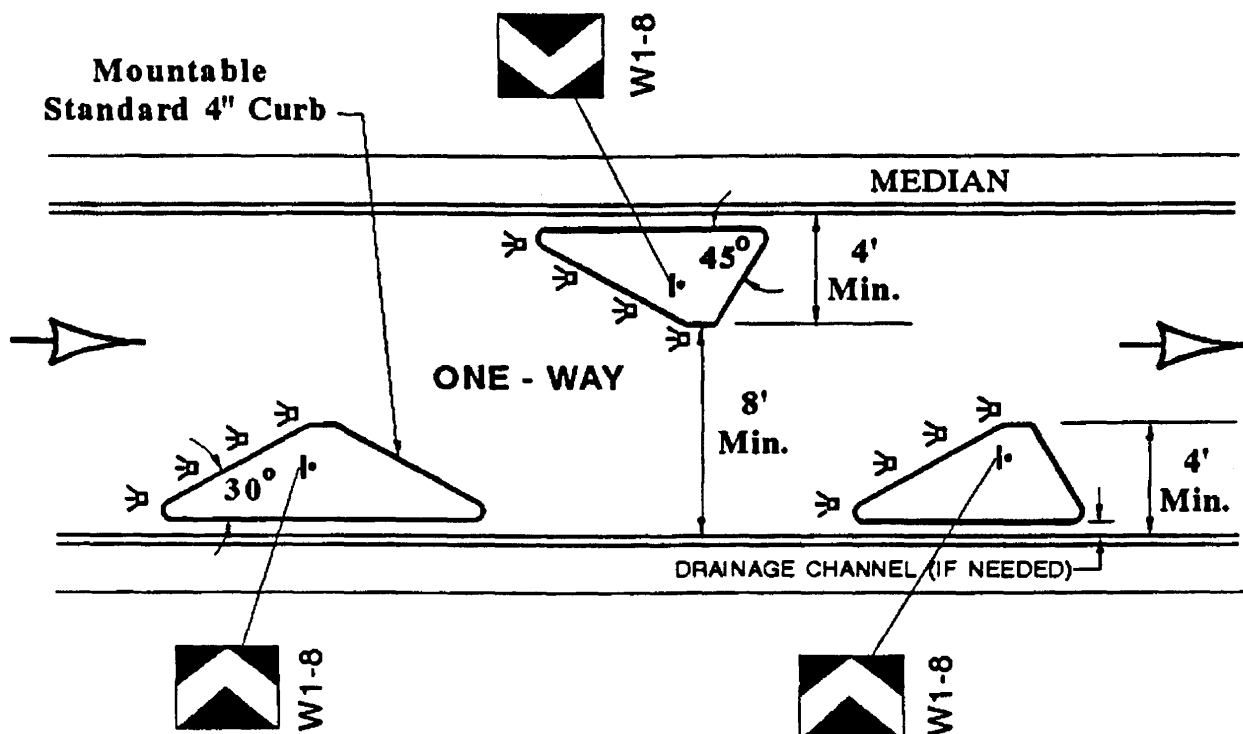
R Yellow Reflective Pavement Markers (Optional)

NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Landscaping designs, if any, to be determined by the community and approved by the Engineer.
- 3) Design Options:
 - a) Intersection or Mid-block.
 - b) Combined with Raised Crosswalk.
- 4) Engineer to modify design and location to accommodate field conditions (ex. drainage) while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

TRAFFIC CALMING DEVICE

Figure B-7. CHICANE



ADVANCE SIGNING

W1-5L

⚡ Yellow Reflective Pavement Markers (Optional)

NOTES:

- 1) Signs and Markings shall be in accordance with the M.U.T.C.D.
- 2) Landscaping designs, if any, to be determined by the community and approved by the Engineer.
- 3) Engineer to modify design and location to accommodate field conditions (ex. drainage) while conforming to VDOT's Road and Bridge Standards and Specification manuals, AASHTO publications and acceptable engineering practices.

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GENERAL ASSEMBLY OF VIRGINIA -- 1998 SESSION

HOUSE JOINT RESOLUTION NO. 229

Requesting the Department of Transportation to study traffic calming measures for high-density traffic areas.

Agreed to by the House of Delegates, February 12, 1998

Agreed to by the Senate, March 10, 1998

WHEREAS, in many areas of the Commonwealth, particularly those experiencing rapid population growth, explosive growth in traffic volume forces large number of vehicles onto roads not designed or built to handle high-density traffic; and

WHEREAS, many of these roads are located in residential areas where high-density traffic is not merely a noisy nuisance, but often an actual danger; and

WHEREAS, among the worst and most wide-spread manifestations of this phenomenon is cut-through traffic operating, often at high speed, through residential subdivisions and other areas not intended for traffic of that sort; and

WHEREAS, there exist several measures that have, in some locations, shown promise in reducing and calming such cut-through traffic; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Department of Transportation be requested to study traffic calming measures for high-density traffic areas. In conducting its study, the Department shall consider, but not necessarily be limited to: installation of speed bumps, establishment of one-way traffic patterns, division of through-streets into abutting cul-de-sacs, creation of four-way stop intersections, and reduction of speed limits. The Department shall solicit and consider comments and suggestions from local governments, planning districts, homeowners' associations, and other community groups.

The Department shall complete its work in time to submit its findings and recommendations to the Governor and the 1999 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

