NEIGHBORHOOD TRAFFIC CALMING PROGRAM

City of Santa Clara
Department of Public Works

April 1999

Approved by City Council 4-27-99

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INTRODUCTION

The Neighborhood Traffic Calming Program (NTCP) was established by the City of Santa Clara to address and resolve local neighborhood traffic concerns and quality of life issues. The NTCP expands the City's current approach to mitigate the neighborhood concerns in a systematic and efficient manner. The program provides outlines of the broad range of possible solutions to the problem(s). The program is based upon the techniques that are being utilized by surrounding cities in the South Bay. In developing the program, City staff reviewed the traffic calming programs of these cities and evaluated their full impacts as well as the relevant experience of each city.

The process begins with the resident reviewing the NTCP guidelines, identifying the problem, and then forwarding the concern to the Traffic Engineering Division staff:

CITY OF SANTA CLARA
Attn: City Traffic Engineer
1500 Warburton Avenue
Santa Clara, CA 95050

Telephone Number: (408) 261-5200
Fax Number: (408) 985-7936

Purpose

The City periodically receives through the various City departments public concerns about excessive vehicle speeding and high cut-through traffic on neighborhood streets in the City. In many instances, when motorists are faced with a congested arterial route choose to use non-arterial streets on neighborhood streets. This consequently has led to an increase in demand from residents for traffic calming devices to be installed in their neighborhood streets to mitigate the subsequent traffic problems that are either real or perceived.

In reaction to these concerns as well as the desires of the City to provide its residents with a methodical approach to managing and quickly respond to these concerns, the City Manager was requested to develop a comprehensive Neighborhood Traffic Calming Program (NTCP). This program is not intended to replace but rather to supplement current City practices.

"Neighborhood Traffic Calming" expresses the sentiments of residents who wish to maintain peaceful and people-friendly streets within their neighborhoods by either minimizing or eliminating the undesirable impacts caused by the motoring public. While all streets are public property, residents have particular concerns about streets in their neighborhoods. The City understands the concerns residents may have regarding their neighborhood streets and supports the residents in taking a special interest. As such, the NTCP aims to facilitate the maintenance and enhancement of elements characteristic of livable communities, which include elements supporting security and safety of all residents and visitors, the sense of home and privacy, and the feeling of community identification.

The City believes this program will provide a framework which can be consistently applied in addressing a myriad of traffic safety concerns as well as quality of life issues as they are encountered by residents and the City. These concerns include limited sight distance, on-street parking, pedestrian and bicyclists safety, right-of-way control, high incidence of accidents, excessive vehicle volumes and excessive speeding. The program is designed, however, to be flexible enough to respond to case-by-case situations and to be amended as necessary. Furthermore, the traffic calming measures included as part of the NTCP should be implemented only to address documented safety or traffic concerns supported by traffic engineering studies. All implementations shall adhere to the guidelines provided in this report unless decided otherwise by the City Traffic Engineer

Has your neighborhood experienced any of the following problems:

- ☐ Limited sight distance – vegetation and parked vehicles.
- ☐ Concern for pedestrian safety.
- ☐ Parking control and prohibition.
- ☐ Right-of-way traffic control at intersections.
- ☐ High incidence of accidents.
- ☐ Excessive vehicle volumes.
- ☐ Excessive speeding.

Here are some of the solutions for the problems identified:

◻ Limited sight distance – vegetation and parked vehicles.

What can be done about sight obstructions or restrictions?

- When foliage is the culprit in compromising sight visibility, City forces will either trim or remove the shrub or tree. When the tree is within the resident's property, the City will notify the resident of his/her responsibility to correct the problem.

- When parked vehicles or other obstructions are causing a sight restriction preventing motorists from seeing approaching vehicles, the City Council can authorize the City Traffic Engineer to prohibit parking of vehicles, garbage bins, storage bins, or any other obstruction to provide all road users with adequate sight distance.

◻ Concern for pedestrian and bicyclist safety.

How can the City help provide a safe environment for pedestrians?

- Police Department conducts pedestrian and bicycle school safety programs (on request). These programs alert and educate pedestrians and bicyclists to potential safety hazards.

- Suggested safe route to school programs. Through cooperative efforts between the City, School Districts, and parents a safe route to and from school can be determined.

- Traffic control tools are available that can assist pedestrians and bicyclists in negotiating street facilities. When warranted marked crosswalks, adult crossing guards, flashing beacons, stop signs, traffic signals, detector loops, pedestrian push buttons, etc. can be used.

- When warranted the construction of sidewalks will provide a path for pedestrians to separate them from vehicles, reducing the potential for conflicts.

- When warranted and when there is sufficient right-of-way, bicycle lanes and bicycle paths can improve the comfort and safety of bicyclists.

- Traffic chokers. These are geometrically designed features that physically narrow the street, reducing the distance for pedestrians when crossing the street.

- Stop signs. These assign the vehicular and pedestrian right-of-way at intersections.

- Traffic signals. Electronic traffic control that assigns vehicular and pedestrian right-of-way at intersections. In addition they facilitate traffic flow through the intersection.

☐ High incidence of accidents.

Depending on the location of reported accidents, some of the solutions that Traffic Engineers have to reduce the number of accidents are the following:

- Speed limit or warning signs. Regulatory signs will inform motorists of the vehicle speeds they are expected to travel and warning signs will alert them to unexpected road conditions.

- Right-of-way control assignments. Where traffic accidents, vehicular volumes, and time delays are substantial, traffic controls like stop signs and traffic signal can help to provide adequate time gaps to enter the intersection.

- Road improvements. When warranted the types of road improvements possible are: sidewalks, street lights, street width modification, etc.

- Request for increased Santa Clara Police Department Traffic Enforcement. Selective enforcement provides an education opportunity by adding emphasis on observing the rules of the road.

- Traffic Engineering Studies and Observations. Traffic volume, speed, roadway, and accident studies can be conducted to assess the nature and extent of the problem. Roadway conditions such as sight distances, pavement conditions, traffic signing, pavement markings, and roadway geometry are reviewed to determine the effect they have on the driving conditions. The findings from these studies can be used to help in lessening the traffic concern by either improving the situation or by demonstrating the situation is not as adverse as perceived.

- Installation of striping, stop signs, additional and larger speed limit signs, and "25" pavement messages. These are recommended as treatments to increase the motorist's awareness and other driving conditions by highlighting various areas of the roadway.

◻ Excessive vehicle volumes.

What types of traffic control tools are available to reduce vehicle volumes?

- Turn prohibition signs. The success of these regulatory signs will depend on their general acceptance by motorists. When posted, they will prohibit specific turning movements.

- Raised curb medians and forced-turn channelization. These are permanent physical features used as street median barrier or at intersections to prevent through traffic from making turning movements onto local neighborhood streets.

- Semi-diverters (half-closures). These are permanent physical structure(s), serving as barriers to prevent access onto local streets by through traffic.

- Diagonal diverters. These are permanent physical barriers that are placed diagonally across the intersections to re-direct through traffic away from local neighborhoods.

- Cul-de-sac. A complete physical barrier blocking through traffic.

◻ Excessive speeding.

How can it be controlled?

- Speed limit signs and "25" pavement messages. Either used separately or as a combination, they are one of the most cost effective measures in increasing the awareness of motorists traveling through a neighborhood street. These two devices do not have glaring negative impacts as far as air quality, emergency response time, maintenance, and liability exposure are concerned.

- When warranted geometrically designed features or barriers can be used, such as speed humps and traffic circles to reduce vehicle speeds on local neighborhood streets.

How can the posted speed limit be enforced or monitored?

- Radar Speed Trailer. The deployment of the radar speed trailer is coordinated by the Police Department. It is primarily used as an educational tool. The primary intent of the radar speed trailer is to remind motorists of the prevailing speed limit and the need to check their speedometer on a more frequent basis. It is important to note that the trailer is not an enforcement device.

- Increased Police Enforcement. Police enforcement has proven, over the years, to be the most effective and successful technique in reducing speeds within a residential area. Police presence alone would increase safety awareness in residential streets. Unlike other costly traffic measures, police enforcement has the distinct advantage of impacting offending drivers without affecting the convenience or mobility of motorists who obey the rules of the road. The speeding pattern sometimes crop up again when enforcement activity is not periodically resumed. Due to various City-wide needs and the amount of traffic movement within the City, particularly during commute hours, the Police Department cannot always provide the desired amount and frequency of enforcement residents would like. Without regular periodic enforcement, long-term benefits of speed reduction may be diminished.

Traffic Management Strategies

Traffic calming options to address residential traffic concerns can generally be categorized as follows:

1. Meeting with and educating residents to better understand the nature and extent of traffic problem(s). A discussion of potential solutions to those problems often brings to light the likely benefits and potential impacts.

2. Enforcing general laws and ordinances pertaining to speed limits, turning restrictions, intersection control and parking regulations. This may entail the establishment or revision of City ordinances.

3. Utilizing traffic control devices that provide specific regulatory, warning or guide messages to pedestrians, bicyclists, motorists and all users of the roadway.

4. Neighborhood meetings and installing physical geometric design features that influence or direct the movement of vehicles, bicyclists or pedestrians within the neighborhood streets. In general, these designs cause either vertical or lateral modifications to achieve their objectives. Only when the methods in items 1, 2 and 3 have proven ineffective should these measures be utilized in addressing residential concerns.

As stated, the NTCP is intended to expand the City's current practices to mitigate cut-through traffic, speeding and other traffic-related problems in residential neighborhoods. In line with the management strategies above, traffic calming options available through the NTCP are generally classified under one of the following three categories:

- **Level 1** -- These measures are generally comprised of studies, data collection efforts, observations, education, public involvement, enforcement efforts, new striping, new signage, parking controls and the use of the speed radar trailer (see categories 1-3 above). These measures are sometimes referred to as passive controls.

- **Level 2** -- These measures include neighborhood meetings and generally require the alteration of the physical configuration of neighborhood streets (see category 4 above). These measures are sometimes referred to as physical controls and common characteristics are that by their physical form they force or prohibit a specific action. These features are largely self-enforcing and create a visual impression that a street is not intended for through traffic. Level 2 treatments include neighborhood meetings, chokers, chicanes, gateways and rumble strips. While Level 2 measures may possibly negatively impact emergency response times of service vehicles, sound engineering and design in coordination with emergency service departments can reduce the impacts to a minimum.

- **Level 3** -- Level 3 measures are similar to Level 2 measures in that they require alteration of the physical configuration of neighborhood streets and force or prohibit a specific action, however, the intrinsic features of Level 3 measures critically affect neighborhood access and emergency response. Level 3 treatments include speed humps, traffic circles, median barriers, forced turn channelization, diagonal diverters and cul-de-sacs. **Because emergency response routes (see pages 15 and 16) are part of vital routes in providing life-saving services to all City citizens and visitors, they will not be eligible to receive Level 3 treatments.**

Table 1

Level 1 Neighborhood Traffic Calming Options

	Traffic Calming Measure	Speed Reduction	Volume Reduction Traffic Diversion	Noise Increase	Loss of On-Street Parking	Access Restriction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Mainten-ance	Estimated Installation Cost
1	Increased Police Enforcement	Yes	Possible	No Change	None	None	None	No	
2	Special Neighborhood Signs	Possible	No	No Change	None	None	None	No	$50 per sign
3	Speed Limit Signs and Pavement Messages	Possible	No	No Change	None	None	None	No	$50 per sign
4	Speed Radar Trailer	Yes	No	No Change	None	None	None	No	
5	Striping Narrower Lanes	Yes	Possible	No Change	None	None	None	Yes	$1,000 per lane mile
6	Higher Visibility Crosswalks	Possible	No	No Change	None	None	None	Yes	$1,000 per crosswalk
7	Stop Signs	Possible	No	Increase	None	None	None	No	$1000 per set
8	Turn Restriction Signs	Possible	Yes	Yes	None	Yes	None	No	$50 per sign

Table 2

Level 2 and Level 3 Neighborhood Traffic Calming Options

A) LEVEL 2

	Traffic Calming Measure	Speed Reduction	Volume Reduction Traffic Diversion	Noise Increase	Loss of On-Street Parking	Access Res-triction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Mainten-ance	Estimated Installation Cost
1	Neighborhood Meetings	Possible	Possible	No Change	None	None	None	No	
2	Chokers	Yes	Possible	No Change	Yes	None	Yes	No	$5,000-$40,000 per set
3	Chicanes	Yes	Possible	Increase Possible	Yes	None	Yes	Possible	$50,000-$75,000 or more
4	Gateways	Yes	Possible	Decrease	None	Yes	Yes	No	$5,000-$20,000
5	Rumble Strips	Yes	Possible	Yes (High)	None	None	None	Yes	$500

B) LEVEL 3

	Traffic Calming Measure	Speed Reduction	Volume Reduction Traffic Diversion	Noise Increase	Loss of On-Street Parking	Access Res-triction	Bus Route and Emergency Vehicle Response Impacts	Increase in Street Mainten-ance	Estimated Installation Cost
1	Neighborhood Meetings	Possible	Possible	No Change	None	None	None	No	
2	Speed Humps	Yes	Yes	Increase	Yes	None	Yes	Yes	$2,000-$4,000 per hump
3	Traffic Circles	Yes	Possible	No Change	Yes	None	Yes	Yes	$5,000-$20,000
4	Median Barrier	Possible	Yes	Decrease	None	Right Turn Only	Yes	No	$5,000-$20,000 per block
5	Intersection Channelization	Yes	Possible	No	Yes	None	Yes	Possible	$30,000
6	Diagonal Diverter	Yes	Yes	Decrease	Possible	Left or Right Turn Only	Yes	No	$10,000-$15,000
7	Cul-De-Sac (Dead end)	Yes	Yes	Decrease	Yes	Total	Yes	No	$50,000

Impacts of Traffic Calming Measures

While Level 2 and Level 3 options have the potential to achieve the desired results, they can also present significant problems that compound the initial concern of the resident. From the resident's point of view, the benefits are quite often obvious while the shortcomings may be less apparent. There are different types of traffic calming devices and measures, and their impacts will vary depending on the application and the existing roadway conditions. In recommending the use of Level 2 and Level 3 calming measures, it will be the City's policy to proceed with caution and to fully investigate potential problems associated with their implementation.

In order to determine the suitability of traffic calming devices for remedying residential traffic problems, it is first important to quantify the problem to determine the nature and extent of the problem(s) to be solved. Each problem should be handled on a case-by-case basis and described qualitatively as well. Also, the real problem, not just the perceived concern, must be identified to ensure the solution achieves the desired result.

The experiences of other jurisdictions illustrate that negative impacts must be identified and then weighed against the benefits of the proposed traffic calming method. Furthermore, delays to services including transit, police, fire, ambulance, waste collection, and street cleaning can have adverse implications, resulting in a compromise to neighborhood safety and livability. Traffic calming measures and devices should be applied only where sound engineering judgement justify their use. The City, however, shall strive for a balance between responsive customer service and sound engineering judgement in dealing with residential requests for Level 2 or Level 3 traffic calming devices and measures.

The emergency response route table and map in the following pages show the residential streets that are highly utilized by the Police and Fire Department. **Because these streets are part of vital routes in providing life-saving services to all City citizens and visitors, they will not be eligible to receive Level 3 treatments.** These emergency response routes, however, are eligible for Level 2 treatments. Like Level 3 devices, Level 2 devices have a negative impact on the response times of emergency vehicles/units, but to a lesser degree.

Figure 1

Police and Fire Emergency Response Routes
Two-Lane Residential Streets

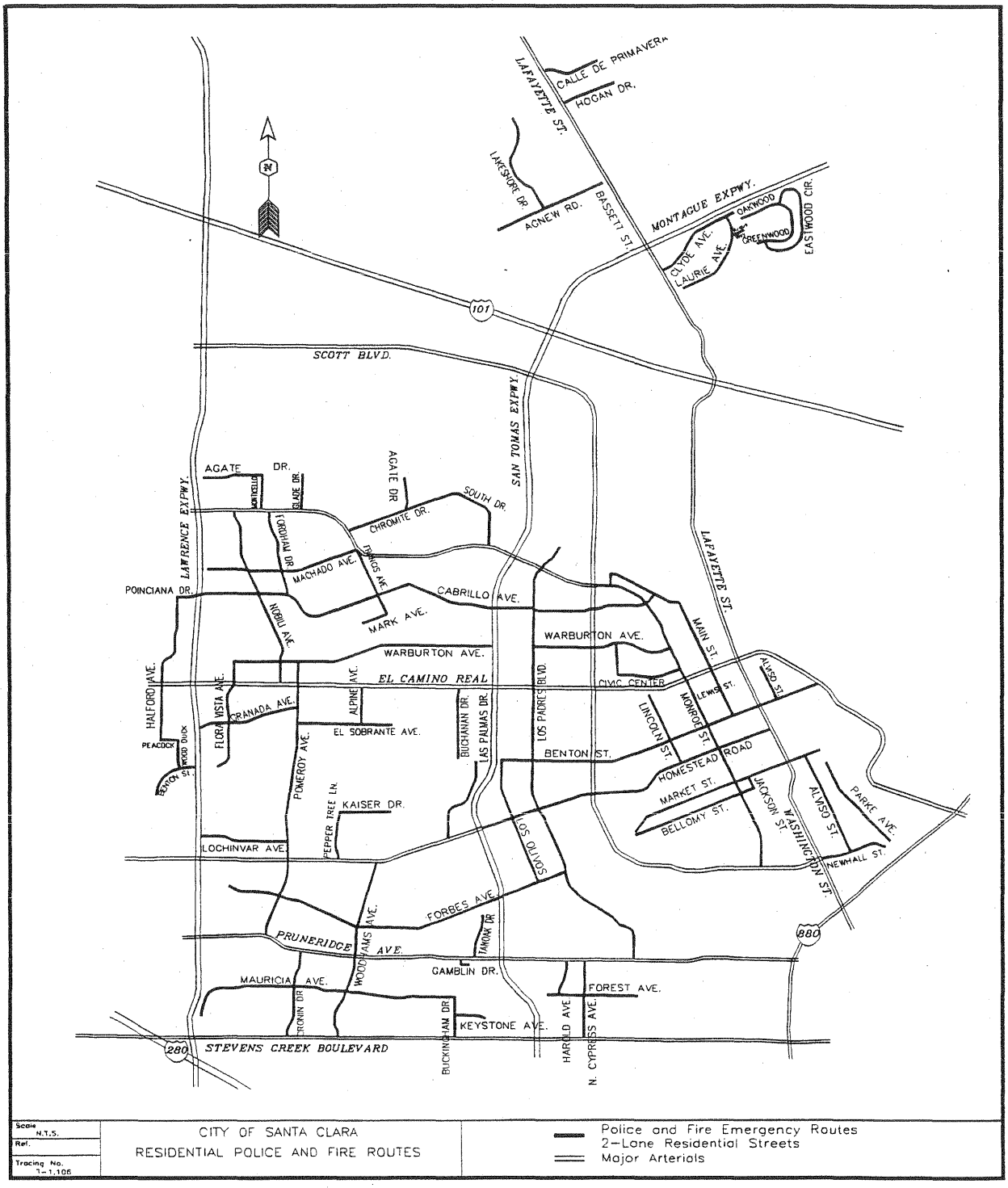

Table 3

Police and Fire Emergency Response Routes
Two-Lane Residential Streets

STREET	LIMITS		
	ENTIRE LENGTH	FROM	TO
Agate Drive		French Street	Monticello Way
Agate Drive		Chromite Drive	700' North of Chromite Dr.
Agnew Road		Calabazas Creek	Lafayette Street
Alpine Avenue	X		
Alviso Street		Benton Street	Lewis Street
Alviso Street		Market Street	Newhall Street
Argus Way	X		
Belomy Street		Saratoga Avenue	Jackson Street
Benton Street		Wood Duck Avenue	Lawrence Expwy.
Benton Street		Los Olivos Drive	El Camino Real
Buchanan Drive		Benton Street	El Camino Real
Buckingham Drive		Stevens Creek Blvd.	Mauricia Avenue
Cabrillo Avenue		Lawence Expwy.	Main Street
Calle De Primavera	X		
Chromite Drive	X		
Clyde Avenue	X		
Civic Center Drive		Warburton Avenue	Monroe Street
Cronin Drive		Stevens Creek Blvd.	Pruneridge Avenue
Cypress Avenue		Stevens Creek Blvd.	Pruneridge Avenue
Eastwood Circle	X		
El Sobrante Avenue	X		
Flora Vista Avenue		Benton Street	Warburton Avenue
Forbes Avenue		Harvard Avenue	Los Padres Blvd.
Fordham Drive		Cabrillo Avenue	Monroe Street
Forest Avenue		Brookside Avenue	Henry Avenue
Francis Avenue	X		
Gamblin Drive		Pruneridge Avenue	Fontana Drive
Glade Drive	X		
Granada Avenue		Lawence Expwy.	Pomeroy Avenue
Greenwood Drive	X		
Halford Avenue	X		
Harold Avenue		Forest Avenue	Pruneridge Avenue
Hogan Drive	X		
Homestead Road		San Tomas Expwy.	Lafayette Street

Table 3 (Continued)

Police and Fire Emergency Response Routes
Two-Lane Residential Streets

STREET	LIMITS		
	ENTIRE LENGTH	FROM	TO
Jackson Street		Bellomy Street	Market Street
Kaiser Drive	X		
Keystone Avenue		Buckingham Drive	Saratoga Avenue
Lakeshore Drive	X		
Las Palmas Drive		Homstead Road	Benton Street
Laurie Avnue	X		
Lincoln Street		Homstead Road	El Camino Real
Lochinvar Avenue	X		
Los Olivos Drive	X		
Los Padres Blvd.	X		
Machado Avenue		Del Monte Avenue	Monroe Street
Main Street		Sahara Way	Benton Street
Mark Avenue		Santa Cruz Avenue	Francis Avenue
Market Street		Saratoga Avenue	The Alameda
Mauricia Avenue	X		
Monroe Street		Scott Boulevard	Newhall Street
Monticello Way	X		
Newhall Street		Washington Street	East City Limits
Nobili Avenue		El Camino Real	Monroe Street
Oakwood Drive	X		
Park Avenue		Bellomy Street	East City Limits
Peacock Avenue	X		
Pepper Tree Lane		Homstead Road	Kaiser Drive
Poinciana Drive		Halford Avenue	Lawrence Expwy.
Pomeroy Avenue		Pruneridge Avenue	Warburton Avenue
Sahara Way		Monroe Street	Main Street
South Drive	X		
Tan Oak Drive	X		
Warburton Avenue		Flora Vista Avenue	Laine Avenue
Warburton Avenue		Los Padres Blvd.	Monroe Street
Wood Duck Avenue		Benton Street	Peacock Avenue
Woodhams Road	X		

Procedure for the Evaluation of Requests

1. Citizens shall submit a request for implementation of traffic calming measures in writing to the following:

   City of Santa Clara
   Traffic Engineering Division
   1500 Warburton Avenue
   Santa Clara, CA 95050

2. Initial steps will be to consider and determine the effectiveness and feasibility of Level 1 Traffic Calming measures in mitigating the concern(s). The City Traffic Engineer will work directly with citizens to develop solutions involving Level 1 treatments.

3. Should Level 1 treatments prove unsatisfactory in resolving the concern, Level 2 and Level 3 treatments will then be considered. A neighborhood meeting will be scheduled to allow residents of the impacted neighborhood to express their concerns. The meeting will be conducted to identify the issue(s) of concern and to arrive at a feasible solution. A neighborhood representative or contact person shall be identified/selected at this meeting. The designated representative will be given a standard Traffic Calming Request/Petition Form and will be expected to collect all necessary signatures from residents. Also, the neighborhood representative will act as a facilitator between the neighborhood residents and the Traffic Engineering Division staff.

4. The neighborhood representative indicated above shall return the completed Request/Petition Form to the Traffic Engineering Division within 30 calendar days. All residents of the affected neighborhood are to be contacted and the petition must contain the signatures of property owners representing at least 70% of the properties that face directly on the block under consideration. There must also be 100 percent concurrence from residents within 100 feet of the proposed Level 2 or Level 3 device. A separate petition must be submitted for each block.

   If the neighborhood representative cannot obtain the necessary neighborhood concurrence, Level 2 and Level 3 devices will not be used and the Traffic Engineering Division will continue to investigate the use of Level 1 treatments in mitigating the traffic concern.

   Completed petitions shall be submitted to the Traffic Engineering Division at the address indicated above.

5. Once the petition is received, the Traffic Engineering Division will undertake engineering studies and will work closely with the Police and Fire Departments to determine whether or not the street in question meets the established criteria for an installation.

If the street is eligible for a Level 2 or Level 3 device, the matter will be scheduled for an upcoming City Council meeting. All residents will be notified of the proposal and will be given the opportunity to address Council. If the recommendation is denied, the Level 2 or Level 3 device will not be used and the Traffic Engineering Division will continue to investigate the use of Level 1 treatments in mitigating the traffic concern. If the recommendation is approved, on the other hand, the Level 2 or Level 3 device will be scheduled for installation.

If, on the other hand, it is determined that the street is **not** eligible for the requested Level 2 or Level 3 device, the representative will be notified in writing giving the reason why the street is not eligible. The designated neighborhood representative will be given 15 days to appeal the decision in writing to the Traffic Engineering Division. Only then will the appeal be scheduled to be heard before the City Council.

If the appeal is denied, the Level 2 or Level 3 device will not be used and the Traffic Engineering Division will continue to investigate the use of Level 1 treatments in mitigating the traffic concern. If appeal is approved, on the other hand, the device will be scheduled for installation.

6. Evaluation of Level 2 and Level 3 devices will be done on a first-come first-served basis.

7. Level 2 and Level 3 devices will only be installed in conformance with the design guidelines that have been established by the City Traffic Engineer.

8. If there is subsequently a desire by residents to remove a Level 2 or Level 3 device, it will only be considered for removal after a petition requesting removal is received by the Traffic Engineering Division from property owners representing at least 70% of the properties that face directly on the block.

9. Contracts for the installation of Level 2 or Level 3 device installations will be bid semi-annually. When funding runs out, improvements will be done after subsequent budgets are approved. All installations will be prioritized according to the priority scoring system established in this report.

CITY OF SANTA CLARA

Traffic Engineering Division

PETITION FOR INSTALLATION OF LEVEL 2 AND LEVEL 3 TRAFFIC CALMING DEVICES

The undersigned approve/disaprove the implementation of a traffic calming measure on the following residential street:

on _____ between _____ and _____

The undersigned have read the Neighborhood Traffic Calming Program (NTCP) installation and removal policy and fully understand the procedures.
All persons signing this petition do hereby certify that they reside within the area impacted .

Return petition forms to:

City of Santa Clara
Traffic Engineering Division
1500 Warburton Avenue
Santa Clara, Ca 95050

Contact person(s):_____ Phone No(s): _____
The contact person(s) will act as the facilitator(s) betwen the neighborhood residents and the Traffic Engineering Division staff. The facilitator's duties will include collection of all necessary signatures from residents.

ONLY ONE SIGNATURE ALLOWED FOR EACH ADDRESS

Name (Please Print)	Address	Phone No.	(Signature Required) APPROVE	(Signature Required) DISAPPROVE
1.				
2.				
3.				
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20.				

*** Level 3 devices shall not be installed on emergency response routes.**

Criteria for Installation of Level 2 and 3 Devices

The following criteria must be met for the installation of Level 2and Level 3 devices:

1. The street shall be a two-lane local residential street where the primary function is to provide access to abutting residences. At least 75% of street section must be developed residentially, where schools and parks qualify as residential units.

2. The overall pavement shall be no more than one lane of traffic in each direction.

3. The posted speed or prima facie speed shall be 25 miles per hour or less.

4. Traffic volumes shall be greater than 1,000 and less than 3,500 vehicles per day.

5. The 85th percentile speed shall exceed 33 miles per hour on 25 miles per hour streets.

6. Installation on a primary emergency response route and/or transit route shall **NOT** be permitted.

7. At least 70% of the impacted residents and 100% of residents within 100 feet of the proposed device location shall support the installation. Furthermore, 100% of all impacted residents shall be notified of the petition. The boundaries of the affected areas as well as the identification of the impacted residents will be determined by the City Traffic Engineer.

8. Installation will not be permitted where substantial diversions of traffic to other local streets may occur, i.e. move the displaced traffic onto adjacent residential streets.

9. Devices shall be located a minimum of 5 feet from driveways, manholes, drain inlet, water valves, street monumentation, and other appurtenance.

10. Devices shall be located a minimum of 25 feet from fire hydrants.

11. Devices shall be installed only where minimum safe stopping sight distance (as defined in AASHTO's A Policy of Geometric Design of Streets) can be provided.

12. Emergency response routes (see pages 15 and 16) are not eligible for installation of Level 3 devices.

Additional Criteria - Installation of Speed Humps

The following criteria must also be met for the installation of speed hump(s):

1. The street shall have adequate existing curb and gutter on each side of the street to prevent flooding in the area of the speed hump.

2. The effected street segment should be at least 600 feet in length minimum.

3. The first speed hump in a series should normally be located in a position were it can not be approached at high speed from either direction. To achieve this objective, the first hump should be located at approximately 200 feet from an intersection or a stop sign, unless decided otherwise by the City Traffic Engineer.

4. Speed humps shall not be installed within horizontal curves of less than 300 feet centerline radius, and on vertical curves with less than the minimum safe stopping sight distance. Humps shall be located on tangent rather than curve sections.

5. Speed humps should be located in line with or near residential property lines whenever possible.

6. Speed humps should be located near street lights when possible in order to illuminate speed humps for safe bicycle and pedestrian passageway at night.

7. Spacing between speed humps should be as even as possible in order to produce a relatively uniform speed along the entire street. Speed humps within a series should be placed from 200 to 600 feet part. Spacing should allow at least one speed hump on each block.

8. Emergency response routes (see pages 15 and 16) are not eligible for installation of speed humps.

Priority Scoring System for Installation of Level 2 and 3 Devices

In order to ensure that the City's traffic safety funding is allocated to street segments with the greatest need, a priority point system is used to rank the locations where Level 2 and 3 devices are requested. The Council-approved installations shall be ranked for installation/removal according to the following point system:

- Percent of vehicles exceeding speed limit.....1 point/percentage point
- Number of vehicles over 1,000 daily traffic volume.....1 point/100 vehicles
- Number of reported speed related accidents (in last 2 years.).....10 points/accident
- Vicinity to schools or parks (within 1 block).....5 points each
- Percent of property owners approving installation(s).....1 point/percentage point

The total of the five evaluation criteria shall be used to determine the prioritization of the eligible installations. The installations not funded for a specific funding cycle shall be re-evaluated and shall compete on an annual basis with any new eligible installation on a priority basis.

Conclusion

Instead of replacing current City practices, the emphasis of the Neighborhood Traffic Calming Program (NTCP) is to broaden the traffic calming options available to residents wishing to calm traffic in their neighborhoods. Many of the concerns can be resolved by utilizing current City practices (Level 1) which have consistently proven over the years to be very effective at calming traffic. Ultimately, the program will help all the parties involved in determining the suitability of alternative traffic calming treatment(s) for a given neighborhood.

Basically, traffic calming measures are aimed at counteracting the negative impacts of traffic speeding and cut-through traffic in residential areas. Some of the benefits of traffic calming devices and measures include the following: reduced vehicle speed, reduced traffic flows, improved public safety, increased comfort and mobility for non-motorized travel, reduced noise and air pollution, increased street activity and neighborhood interactions, and a more attractive streetscape. The NTCP can maintain and perhaps enhance the safety, cohesion, and vitality within Santa Clara's neighborhoods with appropriate applications of these treatments. In order to accomplish these objectives, the City will work closely with neighborhoods to improve the process.

LEVEL 1
NEIGHBORHOOD TRAFFIC CALMING OPTIONS

Higher Visibility Crosswalks

Level 1

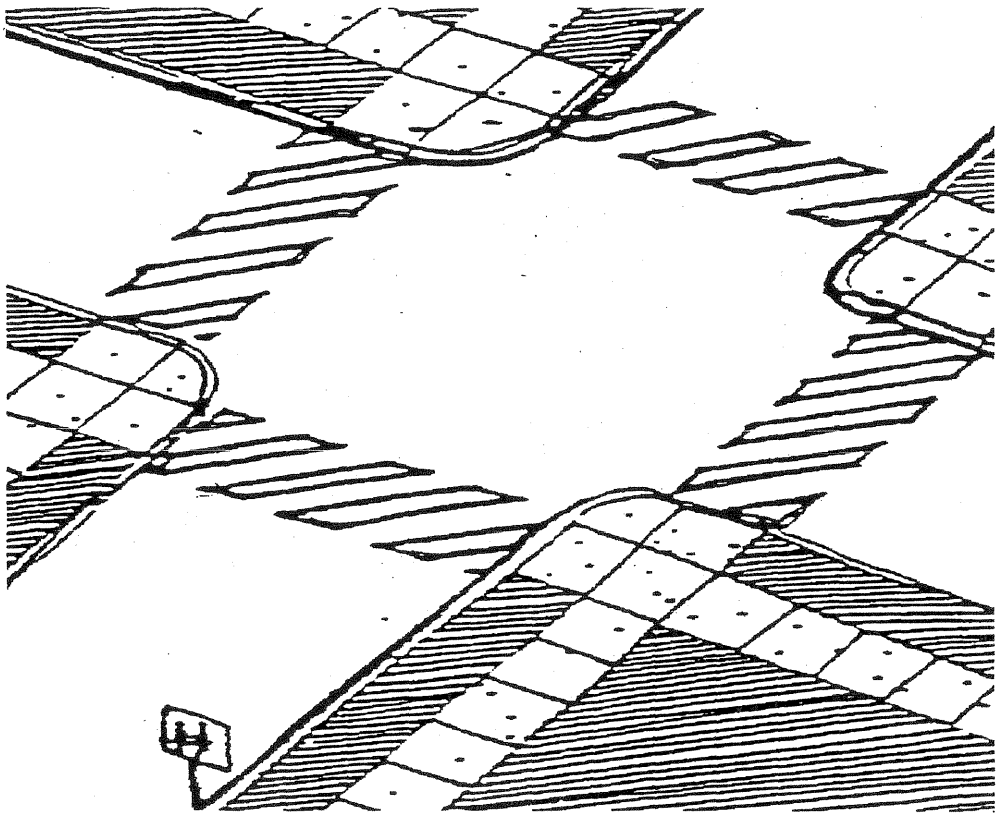
Description: A crosswalk incorporating striped pattern. Mid-block crosswalks are to be avoided because they are unexpected by the motorist.

Positive Aspects:

- More visible to motorists than traditional crosswalks.

Negative Aspects:

- May create a false sense of pedestrian security.
- Requires more maintenance than traditional crosswalks.



Police Enforcement

Level 1

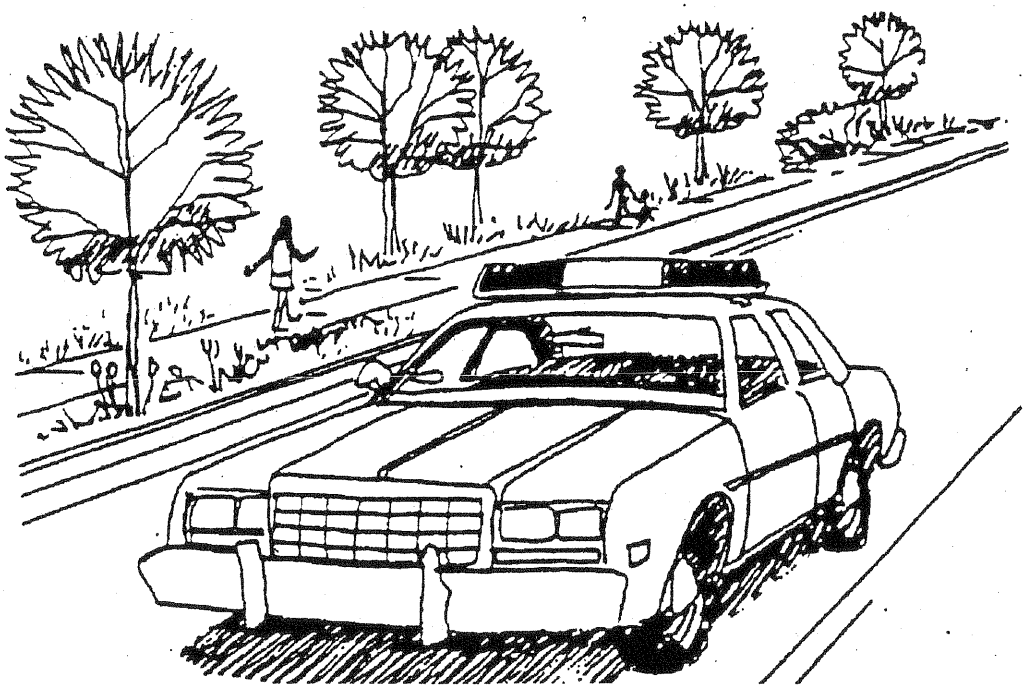
Description: The Police Department deploys units to residential areas with reported problems to perform stepped up enforcement.

Positive Aspects:

- Reduces vehicle speeds.
- May help reduce cut-through traffic.
- Can be conducted during time periods that are deemed to be most problematic.
- Impacts offenders without affecting the convenience or mobility of motorists who obey the rules of the road.

Negative Aspects:

- Without regular periodic enforcement, long-term benefits may be diminished.
- The time period and frequency of enforcement is generally controlled by limited resources and other policing duties.



Special Neighborhood Signs

Level 1

Description: Special neighborhood signs alert motorist to the fact that they are entering a traffic calming area.

Positive Aspects:

- Alert motorists that they are entering traffic calming area.

Negative Aspects:

- Too many signs may become a negative aesthetic impact.

Speed Limit Signs and Pavement Messages

Level 1

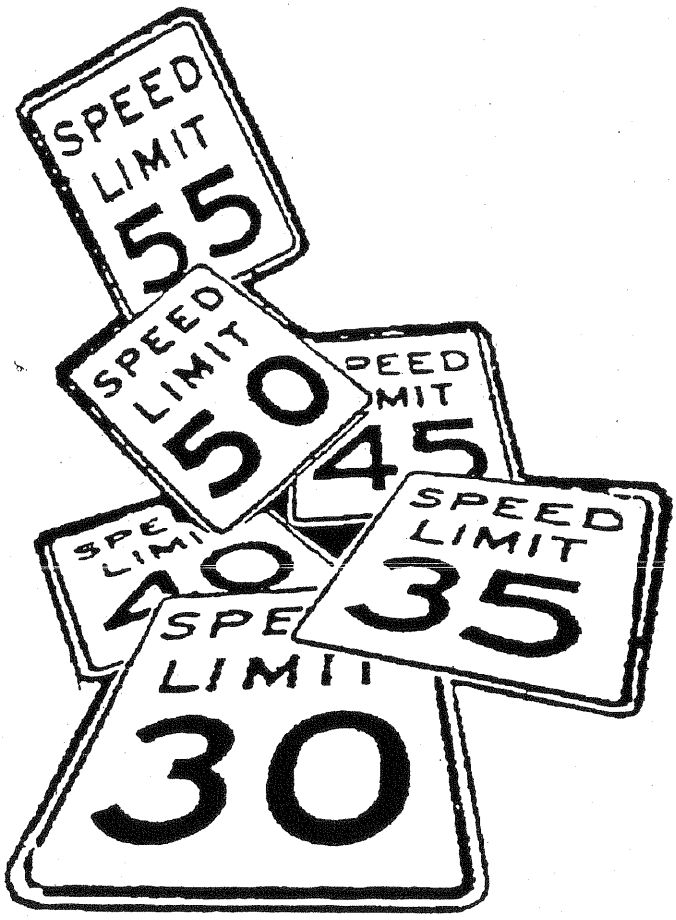
Description: Although all motorists are required to know the prima facie speed limit of 25 mph in a residential area, speed limit signs and pavement messages can help remind motorists of the prevailing speed limit that applies to the street.

Positive Aspects:

- Relatively inexpensive to install.
- In conjunction with regular periods of enforcement, can be effective at reducing speeds.

Negative Aspects:

- Effectiveness is dependent on motorist acceptance and amount of enforcement.



Speed Radar Trailer

Level 1

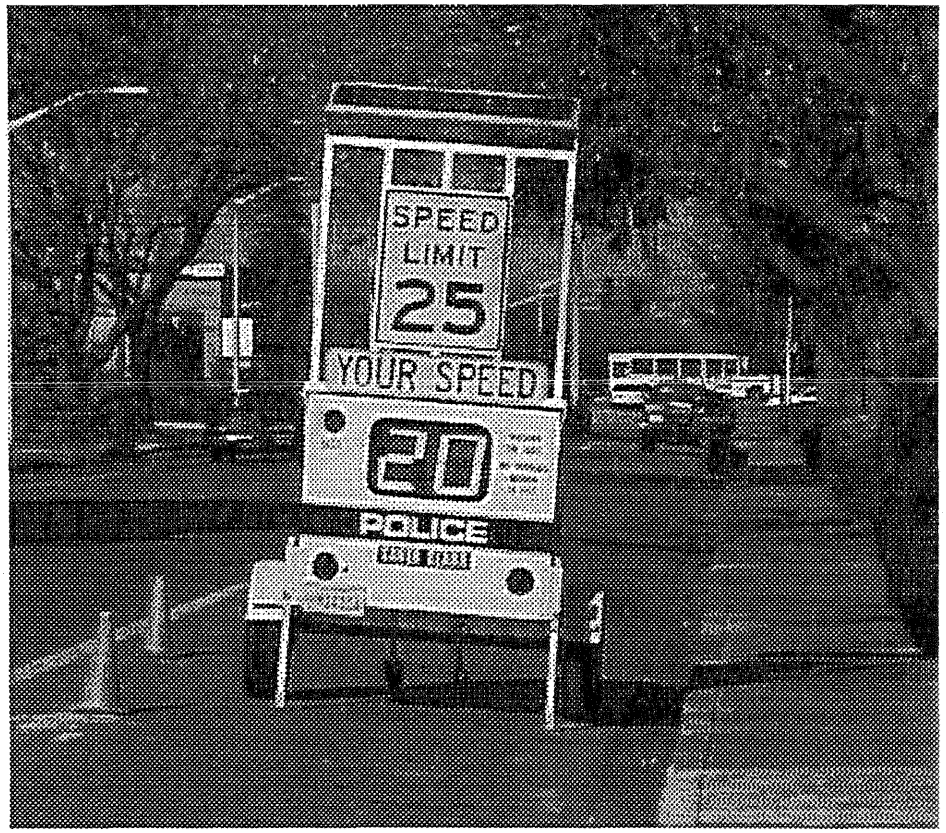
Description: The trailer is primarily used as an educational tool. A speed radar trailer reminds motorists of the prevailing speed limit. They are also capable of measuring vehicle speeds and graphically displaying the speeds of passing vehicles. They are intended to alert motorists to the fact that they may be exceeding the speed limit.

Positive Aspects:

- Vehicle speeds may be reduced at radar trailer location.
- An effective educational tool.
- Can be deployed quickly to trouble spot.
- Information reflected in the displayed speeds can demonstrate to residents that speeds may not be as high as perceived.

Negative Aspects:

- Not an enforcement tool.
- May require temporary parking lane closure – temporarily reduces number of parking spaces



Stop Signs

Level 1

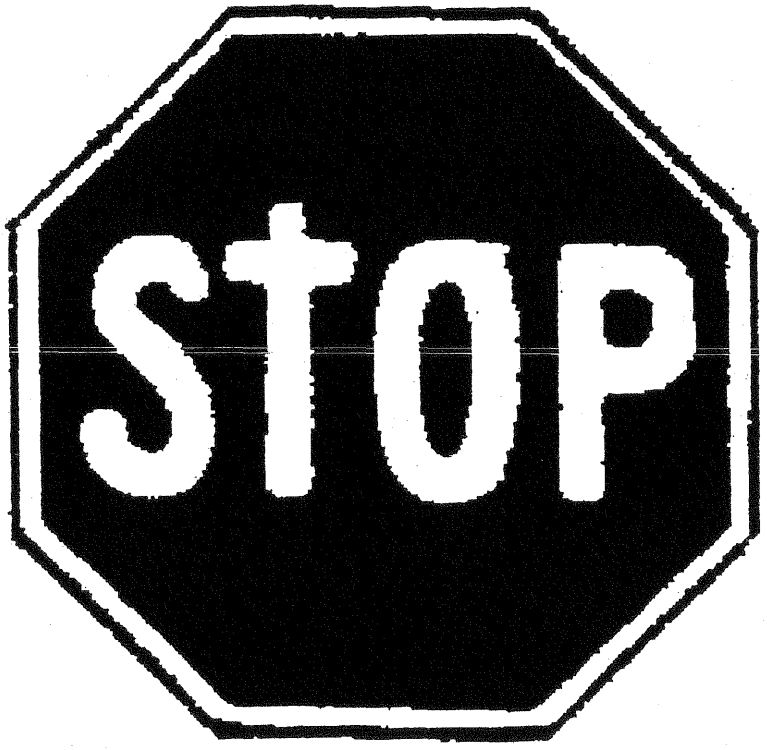
Description: Stop signs are intended to assign the right of way at an intersection and are not to indicated be used as a technique to reduce vehicle speeds or volumes by recognized traffic engineering standards.

Positive Aspects:

- Helps pedestrians, bicyclists and motorists at the intersection decide who has the right of way.

Negative Aspects:

- When used under the wrong conditions, the installation can result in increased localized air pollution, "jack-rabbit" starts, speeding in between traffic controls, noise at the controlled intersection, motorist disregard for the sign(s) and motorist contempt for all traffic controls.
- Creates a false sense of security for pedestrians, especially children.
- When not warranted, increases unnecessary delays for the approaches.
- Frequently not acceptable to residents immediately adjacent to new stop sign locations.
- May encourage high mid-block speeds on long blocks.



Striping Narrow Lane

Level 1

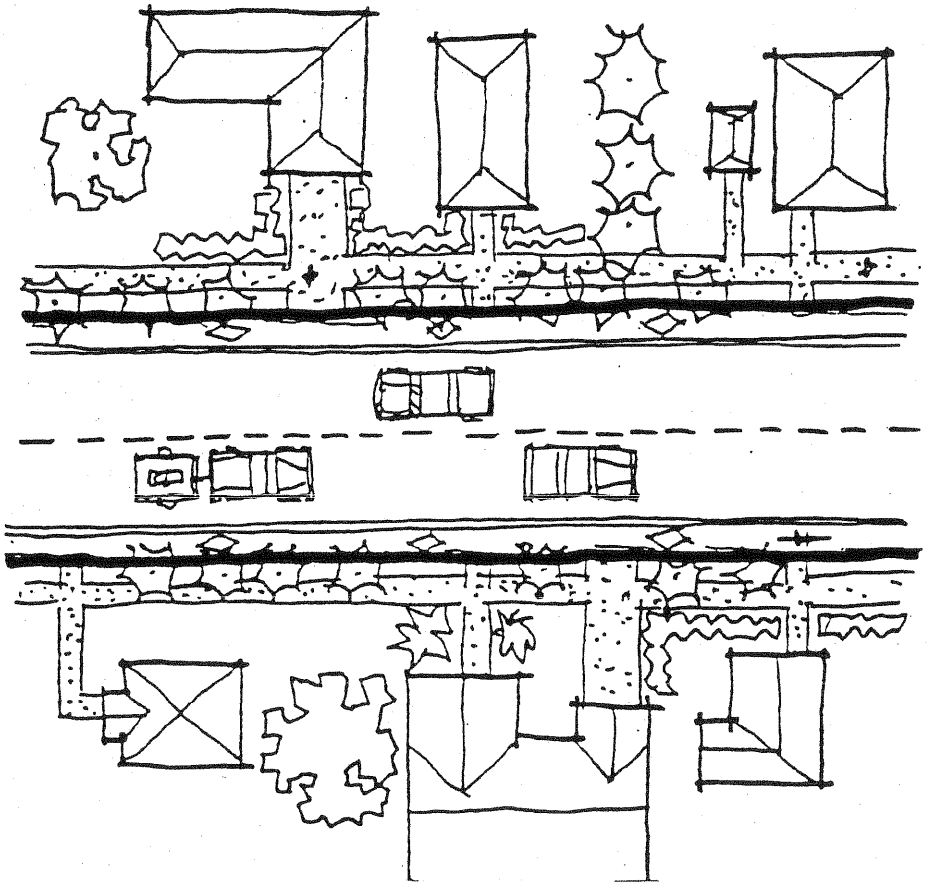
Description: Striping is used to create narrow lanes to give the impression of a narrow street that makes the motorist feel somewhat constricted.

Positive Aspects:

- Changes can be quickly implemented.
- Painted striping can be easily modified.
- Low cost to implement.

Negative Aspects:

- Requires an increase in regular maintenance.
- There is little evidence that narrow striping will consistently reduce vehicle speeds.



Turn Restriction Signs

Level 1

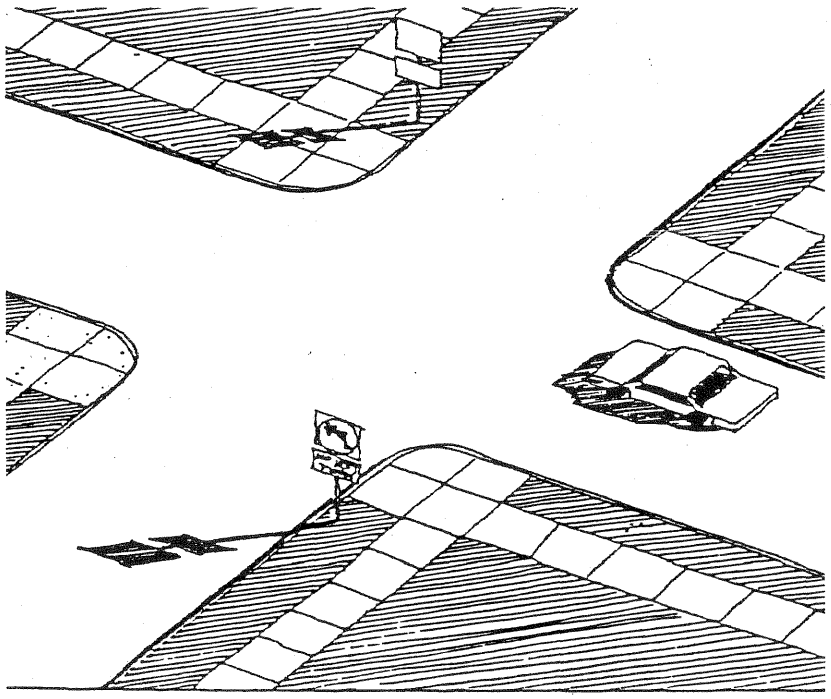
Description: Signs prohibiting certain turning movements to help mitigate cut-through traffic on neighborhood streets. Convenient and logical route alternatives to the prohibited movement must be provided to ensure the effectiveness of the signs. City Council can establish turn prohibitions during certain times of the day, preferably during commute work hours when excessive cut-through traffic are likely to occur in neighborhood streets. This arrangement allows residents full accessibility during the other periods of the day.

Positive Aspects:

- Reduces vehicle volume.
- Can divert traffic to adjacent arterial streets.
- No loss of on-street parking.
- Can reduce noise pollution.
- No increase in street maintenance.
- Low cost to implement.

Negative Aspects:

- Success depends on motorist acceptance and on level of enforcement.
- Without considering overall traffic circulation in area, this measure may divert traffic to adjacent neighborhood streets.
- Limits neighborhood traffic movement.



NEIGHBORHOOD TRAFFIC CALMING OPTIONS
LEVEL 2

Chicanes

Level 2

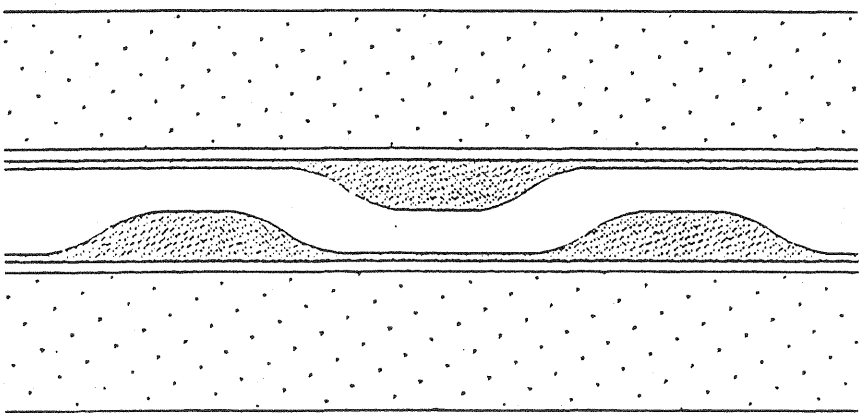
Description: Chicanes are artificial blockages on opposite sides of the street to create an S-curvature on a naturally straight street. Chicanes require vehicles to meander through the roadway alignment.

Positive Aspects:

- May slow down vehicles.
- Can be very effective in changing the initial impression of the street.
- Creates space for landscaping.

Negative Aspects:

- Impedes emergency vehicle, truck and services such as garbage trucks.
- Bicyclists may feel "squeezed in" due to narrower roadway.
- May require modification or reconstruction of drainage features and other utilities.
- May become obstacles for motorists to drive into.
- May require part or all of on-street parking removal.
- High installation cost.
- Increased maintenance.



Chokers

Level 2

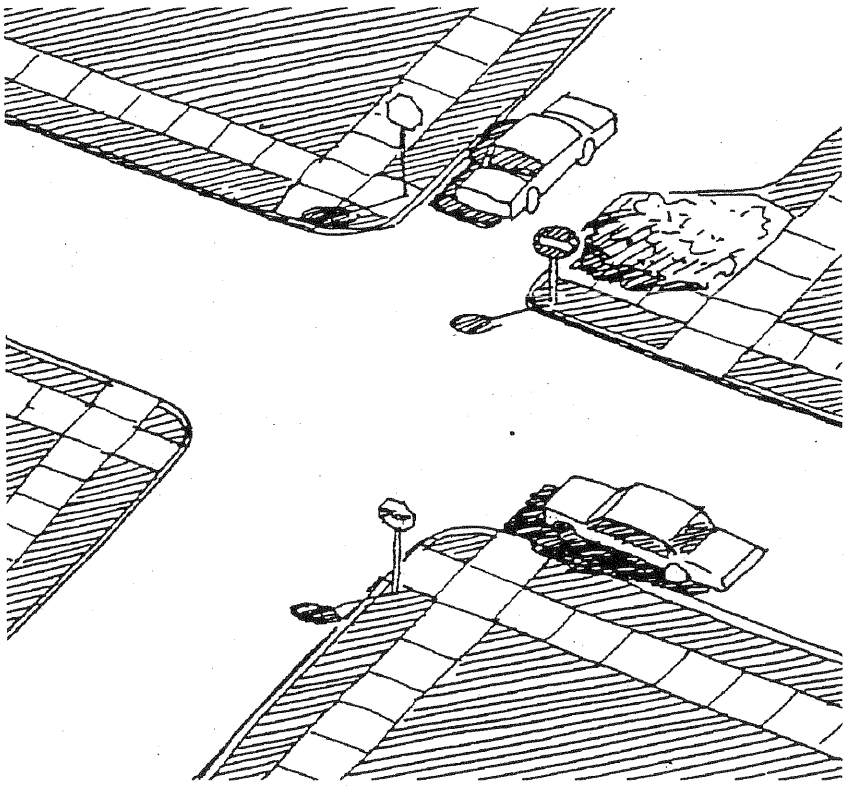
Description: Chokers physically narrow a street either at the intersection, at mid-block or a segment of a street by using curb extensions.

Positive Aspects:

- May reduce speeds by giving motorists the sense of limited space.
- Improves motorist-pedestrian visibility of each other.
- Intersection crossing distance for pedestrians is reduced.
- Allows signs to be located favorably within motorists line of sight.
- Creates space for landscaping.

Negative Aspects:

- Impedes emergency vehicle, truck and other service vehicle access.
- Bicyclists may feel "squeezed in" due to narrower roadway.
- May require modification or reconstruction of drainage features and other utilities.
- May become obstacles for motorists to crash into.
- May require part or all of on-street parking removal.
- High installation cost.
- Increased maintenance.



Gateways

Level 2

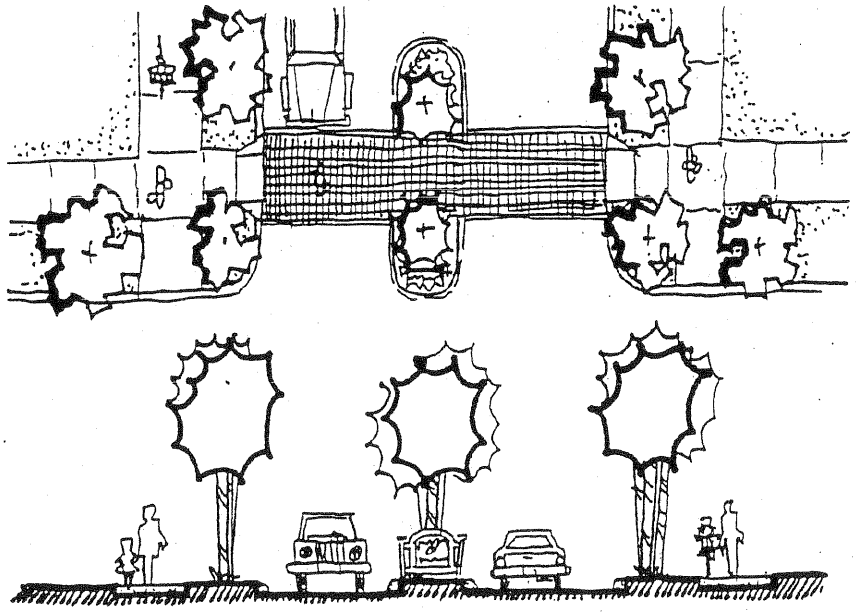
Description: A gateway is a special entrance that reduces width of travel way, often implementing the use of islands. **Gateways are not gates.** The exact physical design of the gateway treatment will depend on existing conditions.

Positive Aspects:

- May eliminate cut-through traffic.
- Reduces speeds in the immediate vicinity.
- Reduces pedestrian crossing distance.
- Allows signs to be located favorably within motorists line of sight.
- May create space for landscaping.
- May create neighborhood identity.

Negative Aspects:

- Impedes emergency vehicle, truck and other service vehicle access.
- May divert traffic to adjacent neighborhood streets.
- May become obstacles for motorists to drive into.
- Low speed of turning vehicles may restrict traffic flow on arterial roadway.
- May require part or all of on-street parking removal.
- High installation cost.
- Increased maintenance.



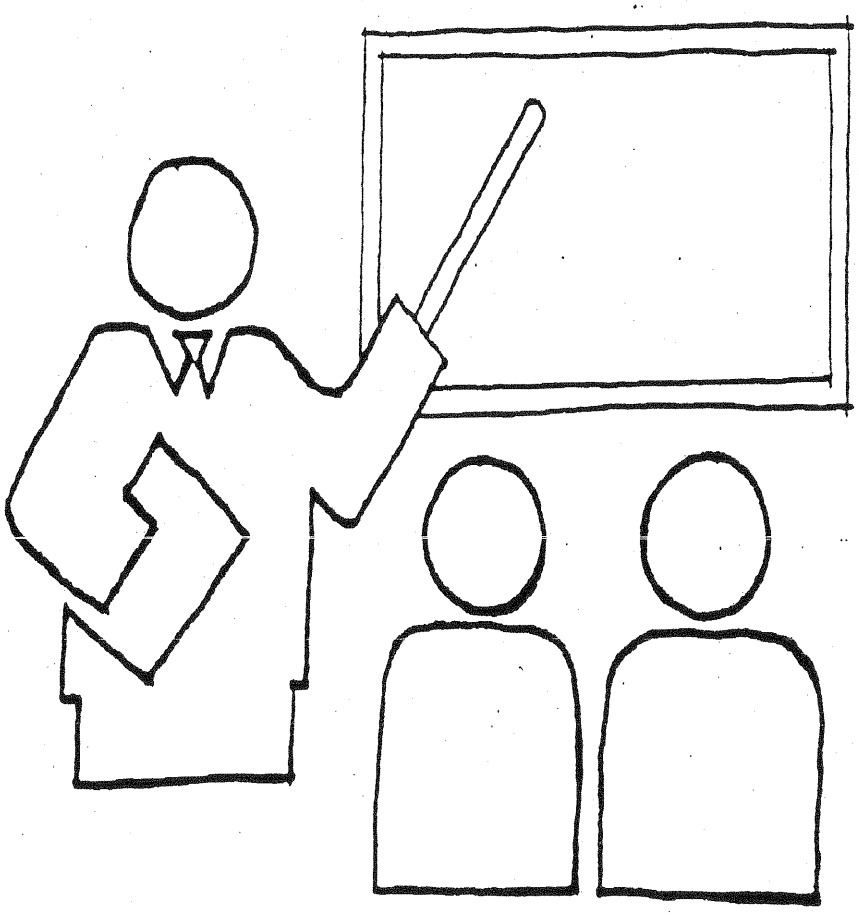
Neighborhood Meetings

Level 2

Description: Neighborhood meetings allow residents to express their concerns. Meetings are generally held at a time and location convenient for residents to attend. The meetings would be used to identify and clarify the issues of concern.

Positive Aspects:

- Allows all residents to express their views.
- Clearly identifies issues of concerns.
- Establishes clear lines of communication between City staff and residents.



Rumble Strips

Level 2

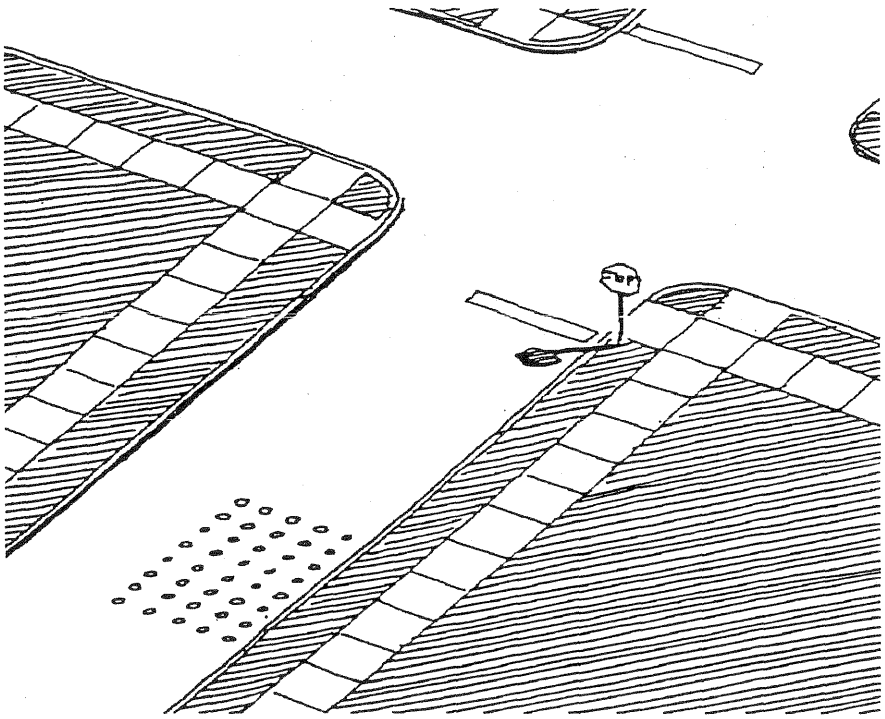
Description: Rumble strips consist of raised markers (dots, bars or grooves) installed within the travel lanes at regular intervals to create noise and vibrations in a vehicle crossing them. Rumble strips are generally not used in residential areas due to the excessive level of noise they produce.

Positive Aspects:

- Reduces vehicle speeds in first time or minimal users of the street.
- The "rumble" heightens safety by alerting drivers to unexpected conditions or notifying drivers to intended action.
- Relatively inexpensive to install, remove or modify.
- No loss of on-street parking.

Negative Aspects:

- Produces high level of noise
- Requires high maintenance.
- May not slow down repeat users of the street.
- May be objectionable to bicyclists.



Cul-De-Sac

Level 3

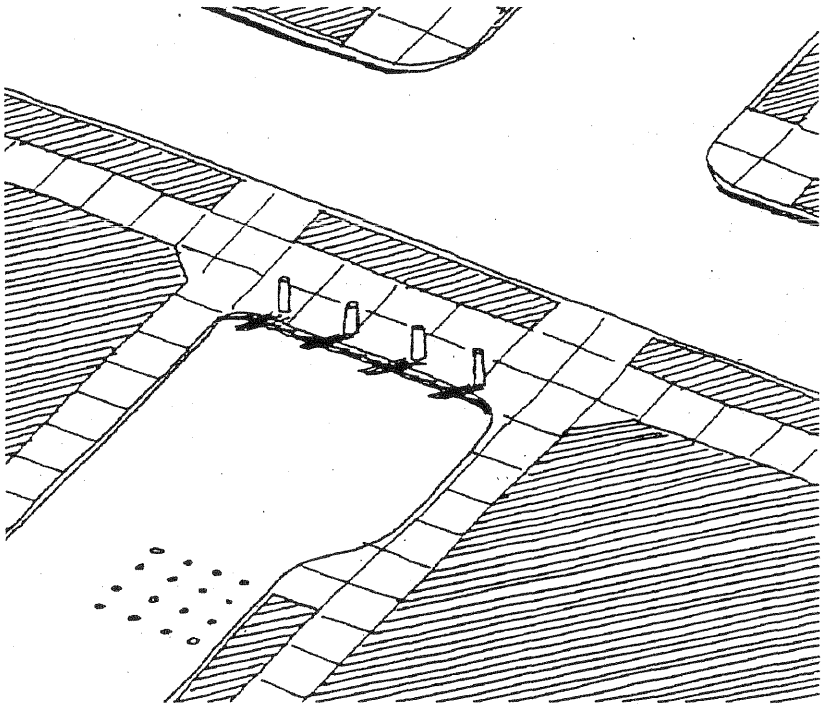
Description: A cul-de-sac is a physical barrier of a street at mid-block or at an intersection. Cul-de-sacs can be thought of as dead-end streets. Cul-de-sacs can be thought of as dead-end streets. An adequate turn around is usually not possible. Mountable curbs should be provided to address any delay problems.

Positive Aspects:

- Eliminates through traffic volumes.
- Reduces noise and speeds in the vicinity of the closure.
- Improves safety for non-motorized users.
- Creates space for landscaping.

Negative Aspects:

- Impedes emergency vehicles, trucks and service vehicles such as garbage trucks.
- May divert traffic to adjacent neighborhood streets.
- Will need adequate turning radius causing vehicles to back up when turning around.
- May require part or all of on-street parking removal.
- Drainage may be affected if used as a part of modification project.
- High installation cost.
- Increased maintenance.
- An inconvenience for residents.



Diagonal Diverters

Level 3

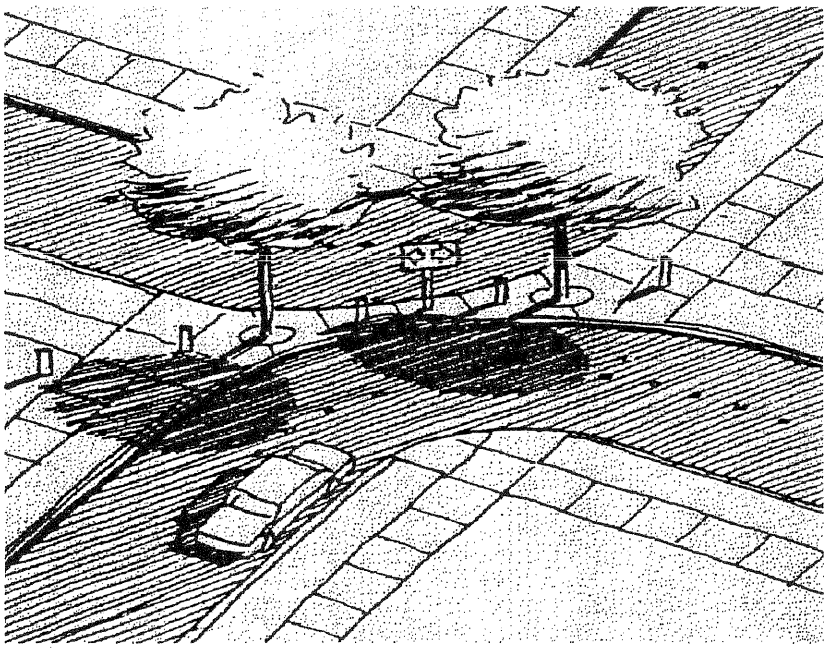
Description: Diagonal diverters are devices that are placed diagonally across an intersection, creating two unconnected streets.

Positive Aspects:

- Eliminates through traffic.
- Will reduce traffic volumes.
- Improves pedestrian safety.
- Reduces right of way conflicts at intersection.
- Can be designed and installed to provide for emergency vehicle access.
- Creates space for landscaping.

Negative Aspects:

- Impedes emergency vehicle routes.
- May divert traffic to adjacent neighborhood streets.
- May become obstacles for motorists to drive into.
- May require part or all of on-street parking removal.
- Speed is reduced only in the immediate vicinity of diverter.
- High installation cost.
- Increased maintenance



Intersection Channelization

Level 3

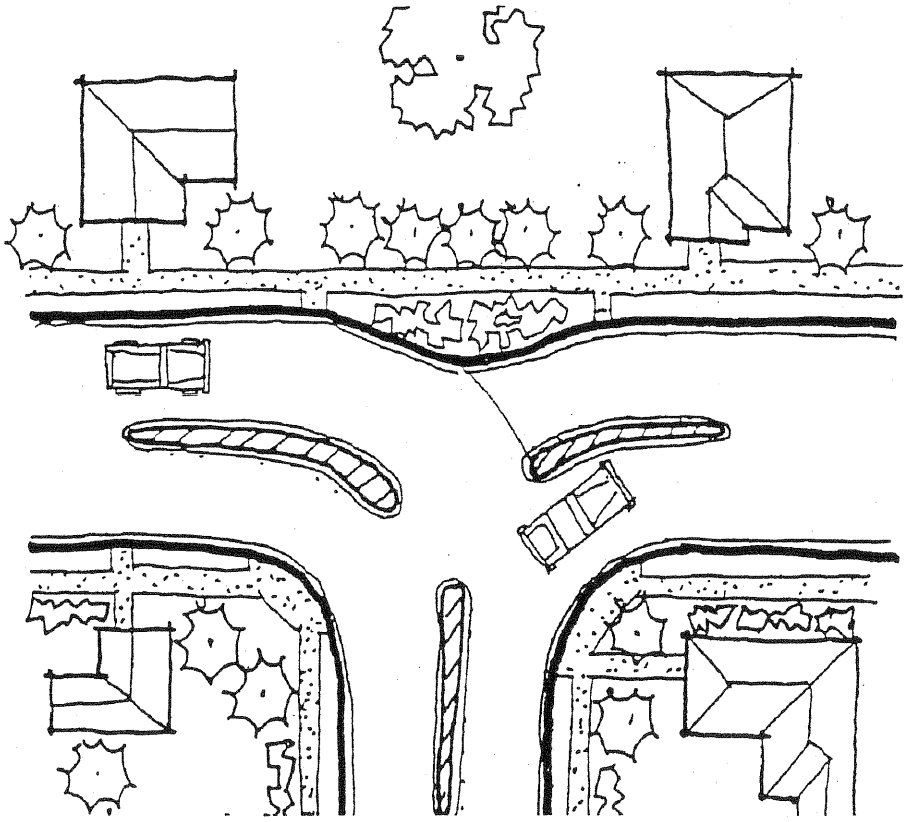
Description: Channelization involves the use of raised islands at intersections designed to force traffic to make or prevent certain movements.

Positive Aspects:

- Reduces cut-through traffic.
- Allows signs to be located favorably within motorists line of sight.
- Can be designed and installed for emergency vehicle access.

Negative Aspects:

- May divert traffic to adjacent neighborhood streets.
- May become obstacles for motorists to drive into.
- May require part or all of on-street parking removal.
- May be violated, particularly in the late evening.
- Turn restriction signs may prove to be effective enough in reducing cut-through traffic.
- High installation cost.
- High maintenance cost.



Median Barrier

Level 3

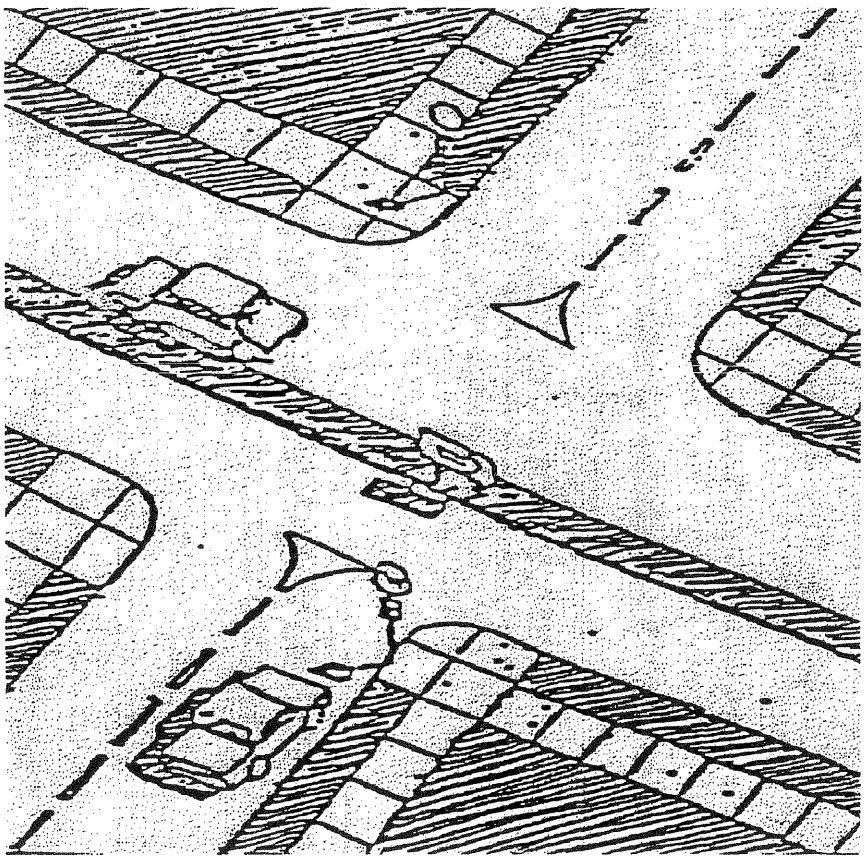
Description: Physical barriers (from flexible delineator posts to k-rails or raised islands) are placed at intersections to prevent left turn movement.

Positive Aspects:

- Improves intersection safety by reducing the number of conflicting movements.
- Reduces cut-through traffic.
- Allows signs to be located favorably within motorists line of sight.

Negative Aspects:

- Impedes emergency vehicle, truck and other service access.
- May divert traffic to adjacent neighborhood streets.
- May become obstacles for motorists to drive into.
- High installation cost.



Neighborhood Meetings

Level 3

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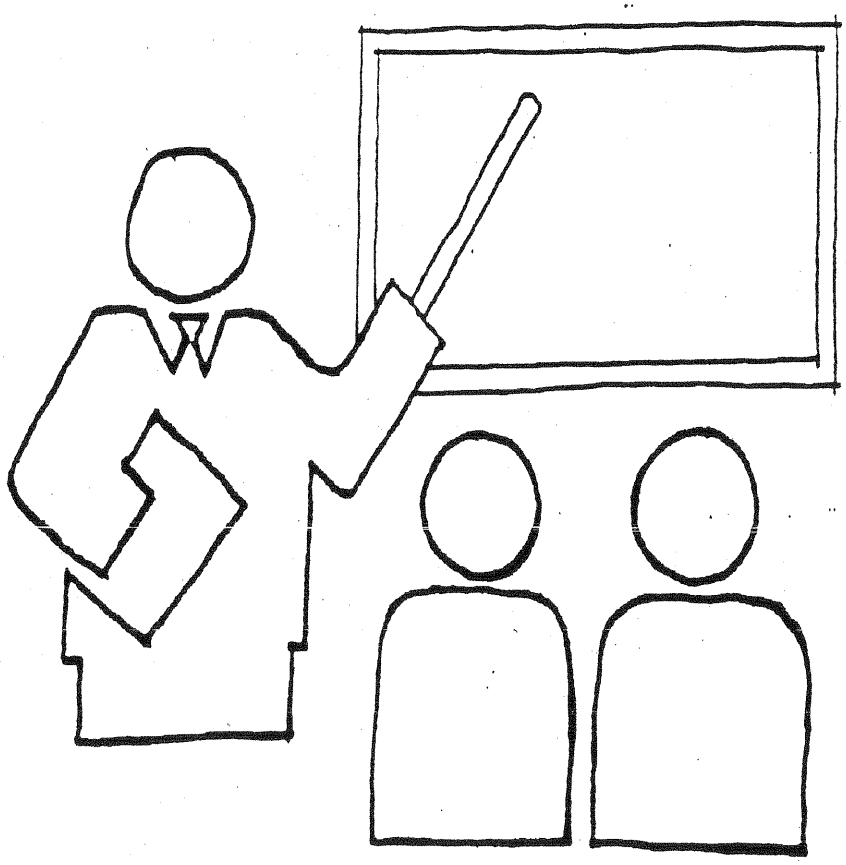


Speed Humps

Level 3

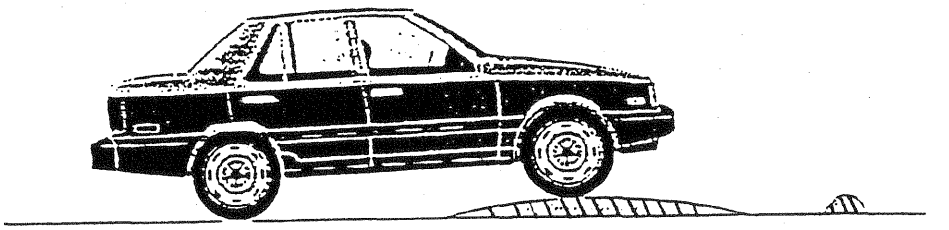
Description: Speed humps or undulations are mounds of paving material that extend across the roadway. They generally have a 12-foot base and a gradual rise and fall 2.5 inches to 3.75 inches.

Positive Aspects:

- May reduce speeds.
- May divert traffic to arterial streets.

Negative Aspects:

- Impedes emergency vehicle, truck and other service vehicle access.
- May divert traffic to adjacent neighborhood streets.
- May be hazardous to an injured patient being transported in an ambulance.
- Contents of vehicles can be jarred.
- May encourage speeding between humps.
- Increase in noise adjacent to speed hump.
- Speed humps have to be reinstalled each time street is resurfaced.
- Increased liability to City.
- High installation cost.



Speed Hump *Speed Bump*

Traffic Circles

Level 3

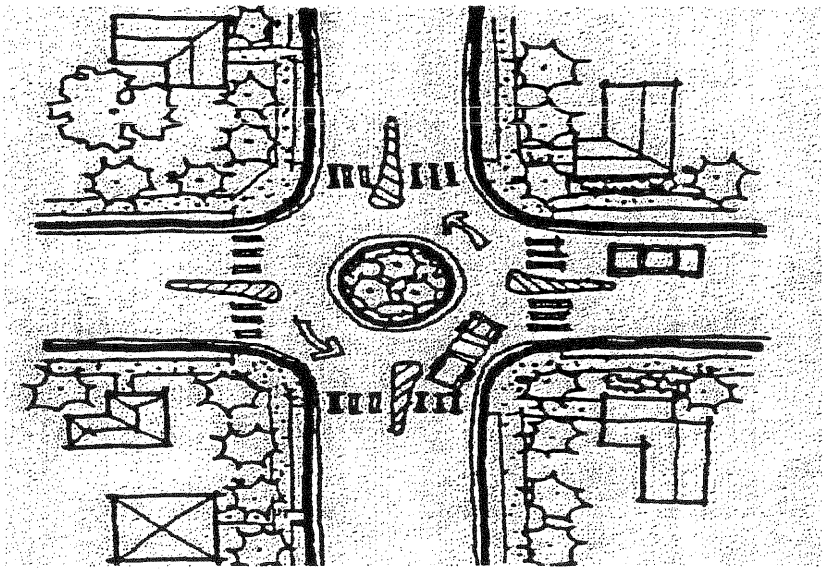
Description: Traffic circles use raised islands placed at the center of an intersection. The approaches to the intersection are generally controlled by "yield signs." Traffic circles force left turning vehicles to travel around the raised. "Splitter islands" can be used to prevent motorists from going around the circle the wrong way

Positive Aspects:

- Significantly reduces speeds.
- Cheaper to maintain than traffic signal.
- Provides equal access to intersections for all drivers.
- May provide a safe environment for bicyclists.
- Creates space for landscaping.

Negative Aspects:

- Impedes emergency vehicle, truck and other service vehicle access.
- Increases pedestrian hazard by bringing vehicles close to crosswalks and the sidewalks.
- May increase congestion in immediate area.
- May become obstacles for motorists to crash into.
- May increase right of way confusion among new users.
- Right-of-way restrictions may apply.
- May inhibit truck movements.
- Required safety signing may detract from its aesthetic quality.
- High installation cost.
- Landscaping will require increased maintenance.



TRAFFIC INFORMATION

SPEED LIMIT

WHEN WILL A LOWER SPEED LIMIT BE POSTED ON MY STREET?

A common belief is that posting a speed limit will influence drivers to drive at that speed. The facts indicate otherwise.

Research conducted in many parts of this country over a span of several decades has shown that drivers are influenced more by the appearance of the highway itself and the prevailing traffic conditions than by the posted speed limit.

California's Basic Speed Law requires that:

"No person shall drive a vehicle upon a highway at a speed greater than is reasonable or prudent having due regard for weather, visibility, the traffic on, and the surface and width of, the highway, and in no event at a speed which endangers the safety of persons or property."

Speed limits are called prima facie limits, which "on the face of it" are safe and prudent under normal conditions. Certain prima facie limits are established by law and include the 25 m.p.h. limit in business and residential districts, the 15 m.p.h. limit in alleys, at blind intersections and blind railroad crossing and a part-time 25 m.p.h. limit in school zones when children are going to and from school. These speeds are not always posted but all California motorists are required to know the basic 15 and 25 mile per hour speed laws.

Speed limits may be established by local authorities on the basis of traffic engineering surveys. These surveys include an analysis of roadway conditions, accident records, and the prevailing speed of prudent drivers. If speed limit signs are posted for a lower limit than is needed to safely meet these conditions, many drivers will simply ignore the signs. At the same time, other drivers will stay within the posted limits. This generally increases the conflicts between faster and slower drivers, reduces the gaps in traffic which could be made safely and increases the difficulty for pedestrians to judge the speed of approaching vehicles. Studies have shown that where uniformity of speed is not maintained, accidents generally increase.

CROSSWALKS

WHEN IS A CROSSWALK UNSAFE?

Apparently, whenever it is **painted** on the street.

A number of years back, the city of San Diego published some startling results of a very extensive study of the relative safety of marked and unmarked crosswalks. San Diego looked at 400 intersections for five years (without signals or four-way stops) that had a marked crosswalk on one side and an unmarked crosswalk on the other. About two and one half times as many pedestrians used the marked crosswalk, but about six times as many accidents were reported in the marked crosswalks! Long Beach studies pedestrian safety for three years (1972 through 1974) and found eight times as many reported pedestrian accidents at the intersections with marked crosswalks than at those without. One explanation of this apparent contradiction of common sense is the false security pedestrians feel at the marked crosswalk. Two painted lines do not provide protection against an oncoming vehicle and the real burden of safety has to be on the pedestrian to be alert and cautious while crossing any street. A pedestrian can stop in less than three feet, while a vehicle traveling at 25 m.p.h. will require 60 feet and at 35 m.p.h. approximately 100 feet.

The California Vehicle Code says that a crosswalk exists at all intersections unless pedestrian crossing is prohibited by signs. Some of these crosswalks are marked with painted lines, but most of them are not. Pedestrian crosswalk marking is a method of encouraging pedestrians to use a particular crossing. Such marked crossings may not be as safe as an unmarked crossing at the same location. Therefore, crosswalks should be marked only when necessary for the guidance and the control of pedestrians, to direct them to the safest of several potential routes.

Mid-block crosswalks or crosswalks between intersections are to be avoided because they are unexpected by the motorist. Pedestrians should be encouraged to cross only at intersections so that they are crossing at a location where drivers will have the expectation of pedestrians and other vehicles being around.

BIKE LANES

WHEN ARE WE GOING TO GET SOME BIKEWAYS IN OUR NEIGHBORHOOD?

Bikeways have raised a lot of interest in the past few years. Some cities have built separate off-road bike paths. Many more have painted bike lanes on streets. Others have installed green "Bike Route" signs without the special lanes.

The cost of both building and maintaining bikeways can be a deterrent to many city bike programs. Initial cost can range from a few dollars to paint a lane to a very large amount to build a separate path including special bridges where needed.

Before plunging into a bikeway program, a city or county should look at the total problem of bicycle operation and safety. Bike lanes and signs alone cannot solve the problem of bicycle accidents; in some places they have increased the problem by giving riders a false sense of security.

An overall bicycle safety program should include: enforcement of traffic laws; bike safety training in the schools at an early age; reminder to wear bike helmets; follow-up training every year in the schools; and involvement of the parents of minor children who violate traffic laws or exhibit dangerous riding habits. The overwhelming cause of bicycle accidents is violation of the RULES OF THE ROAD.

If these recommendations seem to be oriented toward the younger set, there is good reason. Over 70 percent of cyclists involved in accidents were violating a traffic law; over 60 percent were age 17 or under. It only makes good sense to emphasize the children in training programs, since they are the principal users of bicycles.

The bike program for your community should include three principal points:
1. Education in safe riding.
2. Enforcement of rules of the road.
3. Development of well-engineered bike lanes and bike paths.

This will involve the active participation of:
1. The schools.
2. The police or sheriff.
3. The traffic engineers; and, of course, you, the citizen.

"CHILDREN AT PLAY" SIGNS

WHY WON'T THEY PUT UP "CHILDREN AT PLAY" SIGNS?

An often heard neighborhood request concerns the posting of generalized warnings signs with "SLOW – CHILDREN AT PLAY" or other similar messages. Parental concern for the safety of children in the street near home, and a misplaced but wide spread public faith in traffic signs to provide protection often prompt these requests.

Although some other states have posted such signs widely in residential areas, no factual evidence has been presented to document their success in reducing pedestrian accidents, operating speeds or legal liability. Studies have shown that many types of signs attempting to warn of normal conditions in residential areas have failed to achieve the desired safety benefits. If signs encourage parents and children to believe they have an added degree of protection, which the signs do not and cannot provide, a great disservice results.

Because of these serious considerations, California law does not recognize, and Federal Standards discourage, use of "Children at Play" signs. Specific warnings for schools, playgrounds, parks and other recreational facilities are available for use where clearly justified.

Children should not be encouraged to play within the street travelways. The sign has long been rejected since it is a direct and open suggestion that this behavior is acceptable.

STOP SIGNS

WHY DON'T THEY PUT IN MORE STOPS SIGNS?

A stop sign is one of our most valuable and effective control devices when used at the right place and under the right conditions. It is intended to help drivers and pedestrians at an intersection decide who has the right-of-way.

One common misuse of stop signs is to arbitrarily interrupt through traffic, either by causing it to stop, or by causing such an inconvenience as to force the traffic to use other routes. Where stop signs are installed as "nuisances" or "speed breakers," there is a high incidence of intentional violation. In those locations where vehicles do stop, the speed reduction is effective only in the immediate vicinity of the stop sign, and frequently speeds are actually higher between intersections. For these reasons, it should not be used as a speed control device.

A school crossing may look dangerous for children to use, causing parents to demand a stop sign to halt traffic. Now a vehicle which had been a problem for 3 seconds while approaching and passing the intersection becomes a problem for a much longer period. A situation of indecision is created as to when to cross as a pedestrian or when to start as a motorist. Normal gaps in traffic through which crossing could be made safely no longer exist. An intersection which previously was not busy now looks like a major intersection. It really isn't --- it just looks like it. It doesn't even look safer and it usually isn't.

Most drivers are reasonable and prudent with no intention of maliciously violating traffic; however, when an unreasonable restriction is imposed, it may result in flagrant violations. In such cases, the stop sign can create a false sense of security in a pedestrian and an attitude of contempt in a motorist. These two attitudes can and often do conflict with tragic results.

Well-developed, nationally recognized guidelines help to indicate when such controls become necessary. These guidelines take into consideration, among other things, the probability of vehicles arriving at an intersection at the same time, the length of time traffic must wait to enter and the availability of safe crossing opportunities.

TRAFFIC SIGNALS

DOES SOMEBODY HAVE TO BE KILLED BEFORE A TRAFFIC SIGNAL WILL BE INSTALLED?

Traffic signals do not always prevent accidents. They are not always an asset to traffic control. In some instances, total accidents and severe injuries increased after signals were installed. Usually, in such instances, right angle collisions were reduced by the traffic signals, but the total number of collisions, especially the rear-end type, increased.

There are times when the installation of signals results in an increase in pedestrian accidents. Many pedestrians feel secure with a painted crosswalk and a red light between them and an approaching vehicle. The motorists, on the other hand, is not always so quick to recognize these "barriers."

When can a traffic signal be an asset instead of a liability to safety? In order to answer this, traffic engineers have to ask and answer a series of questions:

1. Are there so many cars on both streets that signal controls are necessary to clear up the confusion or relive the congestion?
2. Is the traffic on the mains street so heavy that drivers on the side street will try to cross when it is unsafe?
3. Are there so many pedestrians trying to cross a busy main street that confusing, congested or hazardous conditions result?
4. Are there so many school children trying to cross the street at the same time that they need special controls for their protection? If so, is a traffic signal the best solution?
5. Are signals at this location going to help drivers maintain a uniform pace along the route without stopping unnecessarily?
6. Does the collision history indicate that signal controls will reduce the probability of collisions?
7. Do two arterials intersect at this location and will a signal help improve the flow of traffic?
8. Is there a combination of the above conditions which indicates that a signal will be an improvement rather than detriment?

To aid them in answering these questions, engineers compare the existing conditions against nationally accepted minimum guidelines. These guidelines (often called "Warrants") were established from many observations at intersections throughout the country by experienced traffic engineers. Where the guidelines were met, the signals generally were operating effectively with good public compliance. Where the guidelines were not met, public compliance was reduced, and additional hazards resulted.

A traffic signal that decrease accidents and improves the flow of traffic is an asset to any community. On the other hand, an ill-advised or poorly designed signal can be a source of danger and annoyance to all who use the intersection; pedestrians, bicyclists and drivers alike.