

Neighborhood Traffic Calming Guidelines



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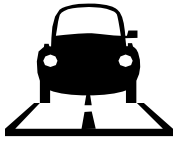
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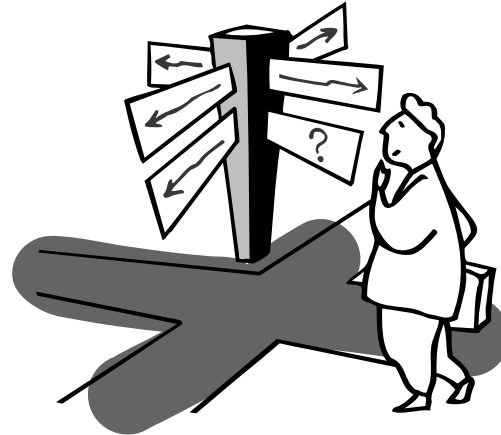
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Introduction

Preface

Since 2002, the City of Merced has received many requests from concerned citizens asking what can be done to slow down traffic that is passing through their neighborhoods. In many instances, citizens request stop signs as a form of Traffic Calming. Studies have shown that traffic speeds do not decrease but in fact increase between signs and the problem isn't resolved.



The City has been looking into various traffic calming measures since 2002. Measures have been mostly installed due to pressure from new developments impacting existing neighborhoods. There have been no guidelines on how to handle pass through traffic in neighborhoods that weren't near new development projects.

These NTC guidelines are being created to assist existing neighborhoods concerned about the traffic passing through their neighborhood, the developer looking for guidelines to reduce the impact of a new project to existing and newly established areas, and lastly to help reduce potentially problematic speeds on the streets of the City of Merced.

For more information about City of Merced's *Neighborhood Traffic Calming Program*, contact the Development Services Department at 678 W. 18th Street, Merced California 95340, telephone (209) 385-6846, FAX (209) 725-8775.

Goals

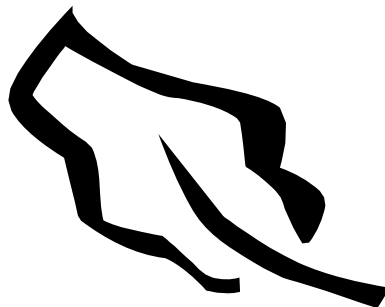
Policies

By carrying out the provisions of these guidelines, the City of Merced hopes to:

In pursuing these goals, the City supports the following policies:

1. Promote safe and pleasant conditions for residents, motorists, pedestrians, and bicyclists on neighborhood streets.**
2. Enable social interaction among neighborhood residents.
3. Control the amount of traffic that uses neighborhood streets and limit vehicle speeds to levels stipulated by the General Plan Circulation Element.**
4. Preserve and enhance pedestrian and bicycle access to neighborhoods.
5. Provide a process that will equitably address request for action by neighborhood residents with needs of all users of City Streets.
6. An integrated road system that is safe and efficient.**
7. A Comprehensive System of Safe and Convenient Pedestrian ways.**

1. To the extent feasible, through traffic should be routed to Arterial Streets, Regional Routes and Highways and away from neighborhood streets.**
2. Access for emergency vehicles should be preserved at levels that meet City response standards.**
3. The City will cooperatively work with its citizens to employ a variety of measures that achieve the traffic speed and volume standards set forth in these guidelines, the Circulation Element of the City’s General Plan, and the State Vehicle Code.
4. Permanent NTC facilities will be designed in conformance with sound engineering and planning practices and should complement the residential character of the neighborhood.
5. NTC activities employed along particular street corridors should not create sub-standard traffic conditions on other streets.**
6. Residents and property owners within an area where NTC facilities are installed should be prepared to share in the cost of their installation.
7. Maintain and improve planning for a pedestrian-friendly environment.**



** These goals and polices are consistent with similar or identical policies found in other adopted City Plans.

Purpose

Traffic Calming is the use of engineered solutions to try to reduce vehicle speeds to an appropriate level and to encourage motorists to utilize appropriate through routes across the city rather than cut through residential neighborhoods. The Institute of Transportation Engineers defines traffic calming as “the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.”

The purpose of the Neighborhood Traffic Calming (NTC) Guidelines is to improve livability by deploying a wide array of engineered calming devices.

Standards and Application

There are several varieties and classifications of streets within the City of Merced. The NTC Guidelines were created to aide various neighborhoods with traffic levels within these neighborhoods.

Local residential streets are low-speed, low-volume roadways that provide for circulation within neighborhoods, with direct access to abutting land uses. They typically have one travel lane in each direction with parking on both sides and driveway entrances from every parcel.

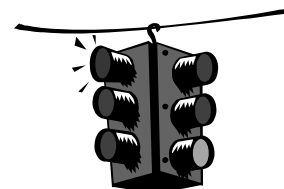
Collector Streets are relatively low-speed, medium-volume roadways that collect and distribute local traffic moving between local and arterial streets. They distribute and collect traffic which is generated in the area circumscribed by major streets. Collector routes provide for circulation

between neighborhoods, they also try to provide a delicate balance between a safe, Pedestrian Street and an efficient mode of transportation through an area.

Major Residential Collectors and Residential Collectors are those defined in the General Plan, and typically have two travel lanes with limited parking in certain locations.

Arterial Streets serve as the basic network for through traffic in and around the City of Merced. They provide connections between the freeways and major destinations in the city and carry cross-town, commercial, and industrial traffic. Arterial streets generally provide direct access to adjacent land uses, although medians and dividers may restrict access. Curb cuts for driveways are limited to essential points and curb parking may be restricted where lane capacity is needed. Arterials may have two, four or six travel lanes. Arterials in newer areas are designed so that driveways are not allowed.

Due to the difference in functionality between roadways primarily meant to provide access to abutting land uses and roadways meant to carry through traffic, the identified concerns and solutions for these roadways differ. Traffic calming devices are appropriate on roadways serving low-to-medium volumes of through traffic. It is for this reason that Arterial Streets and non-residential roadways are not addressed in the NTC Guidelines, and are not eligible for construction of any measures.



Neighborhood Traffic Calming (NTC) Process



General Scope

City of Merced’s NTC Guidelines address the following types of traffic problems in various areas along Local and Collector streets:

- Speeding Traffic
- Too Much Traffic
- Other Disruptive Traffic Conditions
- Pedestrian-Bicycle Safety
- Sight-Distance Problems
- Truck Traffic
- Persistent Traffic Law Violations
- Management of Traffic at Intersections

Request for solutions to “normal safety concerns” should be addressed to the Traffic Committee. If it is determined that the condition is a “normal safety concern,” proper steps will be followed to address and resolve the concern in a timely manor.

When there is a question about what constitutes a “normal safety concern” versus a need for a NTC Device to be installed, the Traffic Committee will make that determination. If there is a disagreement regarding this determination, the application may be presented to the City Council for resolution of the issue.



Defining the Concern

In defining the concern or issue with regards to creating a neighborhood that feels safe and secure, citizens, city staff members, and in some cases the City Council work together to address these concerns.

For the purposes of carrying out these guidelines, the City considers the following to be NTC Thresholds:

- ❖ There are parked vehicles, landscaping or other obstacles that block views of traffic at intersections.
- ❖ There are not adequate gaps in the traffic to allow pedestrians or motorist to cross the street at a particular intersection or location.
- ❖ Traffic speeds are excessive along a segment of street that is less than one block long (1/8 mile).
- ❖ There are a few neighborhood residents that drive too fast down a particular street.
- ❖ Traffic collisions reoccur at a particular location.
- ❖ Motorist continuously drive around a curve too fast and do not stay within the travel lanes.

Defining the Concern (cont'd)

- ❖ Other problems as determined by the City Traffic Committee that may impact single intersections or small street segments.
- ❖ Traffic speeds are excessive along a segment of street that is more than 1/8 mile long and multiple intersections are involved.
- ❖ Traffic speeds are excessive along more than one street corridor within a residential area.
- ❖ Traffic volumes are excessive along one or more street corridors within a residential area.

In general, NTC purpose involves maintaining a safe and friendly neighborhood when excessive speeds or volumes that affect long segments of a residential street, multiple intersections, or a number of street corridors within a particular residential area. Resolution of problems often require an area-wide approach and involves residents, landowners, and motorists driving through the area. It is important that any solution does not create problems in an adjacent neighborhood.

Contacting Staff & Validating the Concerns:

If a resident has a problem with traffic conditions, they should contact the Engineering Representative for Traffic Committee at (209) 385-6846 or schedule an appointment at the Engineering Department; 678 W. 18th Street in Downtown Merced. Staff will work with the citizen to determine whether the concern is valid and to fill

out a *Citizen Action Request Form* – See Appendix D on page 35 for a sample copy.

Upon submittal of a complete *Citizen Action Request Form*, Engineering staff shall schedule the item to be reviewed by the Traffic Committee within 45 days.

If the Traffic Committee determines that the concern is valid, then the applicant will need to collect a simple majority of the affected neighborhood property owner’s signatures with a petition. Residents can also submit letters of concern to the City. Engineering Staff will determine the area that may be included initially.

The purpose of validating the concern is to ensure that there is agreement among neighborhood residents that the concern does exist and that it is not just the perception of a single household. If the Traffic Committee or the neighborhood does not validate the concern, the NTC process ends.

Before the application can become a project, the following forms will need to be submitted with the application:

1. *Citizen Action Request Form*
2. A signed petition and ‘*letters of concern*’ from a minimum of 4 separate neighborhood households.
3. Validation of the concern from the Traffic Committee.
 - a. Minutes from the Meeting

Defining the Study Area:

Once the request has been deemed complete and is ready to become a project, the engineering staff will review traffic conditions in the field with the goal of defining the area that is experiencing the problem(s). They may count motor vehicles or survey the speeds at a few test locations to help define study area boundaries. Based on this staff review, the study area may extend beyond those street segments that were of initial concern. As the NTC process continues, the study area boundaries may be changed to include adjoining areas as more residents become involved.

Surveying the Traffic Conditions:

Once the study area has been defined and mapped, the Engineering Staff will conduct necessary studies within the area. The purpose of this work is to document area traffic conditions and to verify what is causing the source of the concern.

- ❖ *The Engineering Staff will prepare a brief report that presents the results of the fieldwork and conclusions concerning the presence or absence of a NTC concern. The report will be made available to the households involved in the concern validation process. If traffic conditions exceed standards set forth in these guidelines, the NTC process will continue. If traffic conditions do not exceed standards, the NTC process will end. The Traffic Committee and City Engineer are ultimately responsible for making this decision.*

Polling Study Area Households to Support NTC Effort:

With the study area defined and the concern verified, the following process will be followed:

- ❖ *For study areas containing 50 or fewer households, residents will be asked to circulate a petition prepared by the Engineering Staff to all households.*
- ❖ *For study areas containing more than 50 households, residents will be given the choice of either circulating a petition to all households or having the Engineering Department mail ballots to all households.*

These materials (either ballot or petition) will describe NTC problems found in the study area (a synopsis of the staff’s field report) and ask area households to vote on whether a plan should be developed to resolve them. Sample copies are provided in Appendix E on page 37 of these guidelines. The material shall contain an estimate of cost required to be paid by the resident or owner.

- ❖ *A vote in support of preparing an NTC Action Plan will be considered successful with at least 67% of all households in the study areas vote to support the proposition.*



Polling Study Area Households to Support NTC Effort (Cont'd):

If the vote is not successful, the NTC process will end. Residents that wish to continue the NTC process may opt to conduct their own promotional campaign within the study area and submit a petition asking for a new vote within 120 days of the tallying of the first vote.

- ❖ *If the ballot or petition process is successful, the Engineering Department will send a letter to owners of rental properties in the study area. The letter will describe the NTC concerns, summarize the NTC planning process, and identify future opportunities for rental property owners to participate.*

Forming a Neighborhood Action Team – Traffic Committee

With support for preparation of a plan, the Traffic Committee will organize a Neighborhood Action Team of citizens and City staff members. The purpose of the Action Team is to develop equitable and affordable solutions to traffic concerns in the study area. Action Team membership will be established by the Traffic Committee and will provide for fair and equitable representation of study area and community interest.

- ❖ *The following provisions will guide the formation and operation of the Action Team.*
 - *The Action Team should have more than three but less than twelve citizen members.*
 - *Where concerns impact more than one street, the Action Team*

should have representatives from each street.

- *Staff members from the Engineering, Planning, Fire, and Police Departments should be on the Action Team as non-voting members.*
- *An Action Team quorum will be a simple majority of the citizen members. The Action Team will make decisions by general consensus or voice vote when required. Successful voice votes will require the majority of the quorum.*
- *When NTC concerns affect Collector Streets, the Engineering Department will consider soliciting participation from citizens at large with a public notice mailed to the residents address. The citizens at large will be voting member(s) of the Action Team.*

Involving the General Public

In addition to the Action Team membership provisions described above, special care should be taken to involve the general public in the NTC process, especially when the majority of traffic on a particular street that is being considered for NTC activities is *through-traffic* defined as motorist with origins and destinations outside the study area. As a minimum, the following activities should be undertaken to involve the general public:

- ❖ *The location, date, and place of all Action Team Meetings will be advertised in the local newspaper*

and the public will be invited to attend at the cost to the applicant whom is making the request.

- ❖ NTC Action Plans will be published in draft form, their availability advertised in a local newspaper, City’s website, and the general public invited to submit written comments to the Traffic Committee and to attend any scheduled community workshops or meetings.

Considering Initial NTC Proposals

For concerns with speeding traffic, it may be desirable to first try less aggressive measures to solve them before a NTC Action Plan is developed and potentially costly activities are undertaken. If a problem can be solved with few physical changes to a neighborhood at relatively low cost, then the neighborhood and the community at large can benefit through the expeditious implementation of what are referred to here as Initial Activities.

- ❖ The following list specifies Initial Activities (Described in Appendix A, pages 29 and 30, and Appendix E, page 37, of this document) and identifies when they should be considered as part of an NTC program to address the concern.
 - Temporary Speed Trailer
 - Traffic Safety Campaign
 - Requires substantial involvement from the neighborhood.
 - Focused Police Enforcement

- Devices that do not alter the alignment or width of the roadway.
 - Includes landscaping, signs, and pavement marking
- ❖ The Action Team should:
 - Carefully consider the appropriateness of Initial Activities and select those that it is willing to sponsor.
 - Establish a length of time to employ the Initial Activities to test their effectiveness.
 - Assist with the organization and training of study area residents on how to carry out Initial Activities – such as the Neighborhood Speed Watch Program.
- ❖ At the end of the testing period, the Transportation Staff will survey traffic conditions in the study area to determine if Initial Activities have been effective in reducing traffic speeds. Based on the performance of the Initial Activities, the Action Team will decided to:
 - Extend the Initial Activity testing process if the initial trials prove inconclusive; or
 - Terminate the NTC planning process if Initial Activities achieve desired NTC objectives; or
 - Proceed with the preparation of an NTC Action Plan if traffic management objectives have not been achieved.

The City encourages Action Teams to employ Initial Activities as a first step toward solving a traffic problem – especially where people who live within the study area are causing traffic problems. Implementation of Initial Activities often requires the direct participation of study area resident, with the City placing materials and providing and operating equipment as necessary.

Some, Initial Activities may not be practical in a particular study area given the physical characteristic of the neighborhood or the characteristics of the traffic problems themselves. If, after careful evaluation, the Action Team finds that Initial Activities are not appropriate, it may skip this step and proceed with the preparation of an NTC Action Plan.

Preparing and Adopting an NTC Action Plan

Assuming that the Action Team has determined that Initial Activities have not been successful or are not appropriate, the Action Team will prepare an NTC action plan.

- ❖ As a minimum, the NTC Action Plan will include the following items:
 - A background statement.
 - A statement of objectives.
 - A map showing where the study area is within the City of Merced.
 - A map showing the boundary of the study area and adjoining areas, private property lines, all public streets, and the location of all proposed NTC Devices.

- A brief description, accompanied by photographs or drawings, of the different types of NTC devices to be used.
- A Cost Estimate, Funding Sources, a Budget, a description of the intended method for financing the installation of the NTC devices.
- A schedule for installing all of the NTC Devices that includes provisions for phasing as appropriate.
- A description of the monitoring/testing process that will be used to judge the effectiveness of the NTC devices.

Producing the Draft Plan: The Traffic Committee will present the Action Team with a draft table of contents for the NTC Action Plan. The Action Team will establish the NTC Plan’s content including recommended actions and will prepare a draft report. The Traffic Committee will finalize the NTC Action Plan and assemble required graphic material.

The Plan should be concise and inexpensive to reproduce in black-and-white. Colored graphic materials should generally not be used unless absolutely necessary.



Public Notices and Community Meeting: The Traffic Committee staff will distribute the draft NTC Action Plan to all study area property owners and households along with a flyer that advertises the time, date, place, and purpose of a community meeting. The flyer will also establish a public review period of not less than 30 days and provide the address where written comments may be sent.

The availability of the draft plan, and the time, date, place, and purpose of the community meeting will also be published in a local newspaper, with the dates of the public review period of not less than 30 days and will provide the address where written comments may be sent.

The Action Team will sponsor the community meeting with the Traffic Committee making the arrangements. At the meeting, the citizen members of the Action Team will present the Plan's recommendation and the Traffic Committee will record public testimony. Depending on the public's response to the plan, the Action Team may decide to hold more than one meeting as needed.

Voting on the NTC Action Plan: The Action Team will consider all of the testimony received at the community meeting(s) and all written comments received during the public review period. The City Engineer will also be afforded the opportunity to review the draft Plan and submit comments and recommendation to the Action Team.

The Action Team may choose to amend the draft NTC Action Plan in response to the comments and testimony received. The Engineering Department will distribute the final draft plan to all

households and owners of property within the study area along with a ballot. The draft plan will include estimated cost to each owner.

- ❖ A vote to approve a draft NTC Action Plan will be considered successful when 67% or more of the study area's owners support the Plan.

If the vote is not successful, the NTC process will end unless the Action Team chooses to hold additional community meetings, amend the plan to address neighborhood and community concerns and resubmit it to study area households or property owners for a new vote within 120 days of the tallying of the first vote.

City Council Action: If enough study area property owners have voted to support the NTC Action Plan, the draft plan will be submitted to the City Council and the Council will consider adopting it.

- ❖ The City Council will hold noticed public hearings to consider adoption of submitted NTC Action Plans.
- ❖ After considering recommendations from the Engineering Department, the Council may choose any of the following options: approve a draft plan as submitted; approve a draft plan with amendments; continue consideration of a plan and request that the Action Team further evaluate specific concepts; or choose not to adopt an NTC Action Plan. When adopting a plan, the Council may approve variations to provisions contained in these guidelines.
- ❖ If the Council intends to adopt an amended NTC Action Plan where the estimated cost per household for

permanent facilities will increase by more than 25% the Council will continue consideration of the Plan and the amended Plan will be sent to study area households or property owners for a new vote (see previous section).

- ❖ When Council consideration of the NTC Action Plan is complete and the Neighborhood Action Team has achieved its goal, the team will be dissolved.

Funding the NTC Devices

The funding and installation of NTC devices will be the responsibility of the neighborhood that is benefiting from the installation of the NTC devices. The cost of the proposed plan shall be distributed among all property owners within the study area. The City may elect to contribute a portion of the needed funds, up-to a maximum of 25% to the overall project.

Funding the installation of NTC facilities will be the responsibility of the study area households or property owners. The following provisions will be used to establish funding responsibilities:

- **City Funding Allowance:** A funding allowance will be established by evaluation of the Neighborhood Traffic Calming Device and budgeting the funds.
- **Administrative Fees:** The applicant and/or property owners shall be responsible for all administrative fees.
- **Shared Costs:** If the project is estimated to cost more than the amount of the original estimate, the

cost overrun would need to be divided among the study area households whom approved the device(s). Funds to install approved device(s) shall only be required and collected from the individuals that voted in favor of the device(s). Individuals that vote “no” for a particular project shall have the option to contribute to the installation of the proposed device(s).

- **Total Cost of Projects** will include the following components:
 - **Design Costs:** the cost charged by design professionals (City Staff or other licensed individuals) to prepare construction plans for NTC facilities.
 - **Installation Costs:** the cost charged by private contractors or City staff to install NTC facilities.
- The City will be responsible for the perpetual maintenance of NTC facilities in public rights-of-ways or easements.
- **Financing Strategies:** When the individuals living in the area are required to pay for the implementation of an NTC Action Plan, the City will consider a range of funding strategies including but not limited to:
 - Requiring study area households to organize fund raising activities within the neighborhood and be responsible for securing all required funds. The amount paid by individuals shall be refunded if the device(s) are removed.

- *Establishing a Benefit-Assessment District consistent with the provisions of California Law (reference Proposition 218). This option applies mostly to higher-cost NTC solutions and amounts paid by individuals shall be refunded if the device(s) are removed.*
- *Establishing municipal code provisions that enable the City to pay for the installation of NTC facilities then assess individual property owners as part of their annual property tax bill and amounts paid by individuals shall be refunded if the device(s) are removed.*

Carrying Out the NTC Action

Plan: After the Traffic Committee and City Council approvals, the Engineering Department will undertake the following steps:

Installing Temporary Facilities: For some types of NTC devices, the Transportation Staff may find that it is desirable to first install inexpensive temporary facilities. The need to do this will depend on the type of traffic problems being addressed, their scope and severity. For example, it may be desirable to lay out the configuration of traffic circles, medians, bulb outs or other similar devices using cones or reflective pylons and then to witness how motorists navigate around or between them.

The purpose of these types of temporary installations is to test the layout of the design of the permanent device. It is the intent of these guidelines that test periods should be a matter of hours to a few days. However, it may be

appropriate to conduct longer tests – especially for devices that redirect traffic to other street corridors.

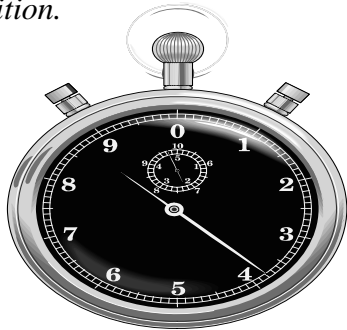
- *If a temporary device is installed for more than a few days, the following should apply:*
 - *The devices should be accompanied by signs that explain the purpose of the facilities, how long they will be there, and provide a telephone number for interested citizens to call with questions.*
 - *Concern for the aesthetic impact of the facilities may be addressed by their design. Temporary landscaping and other aesthetic treatments should be employed whenever possible.*
- *The types of NTC devices that are candidates for temporary installations are identified on Figure 2 in the next section of this document.*

Installing Permanent Facilities: Upon completion of the trial period (where applicable), Engineering Department will design or will hire a qualified consultant to design all permanent facilities. The Traffic Committee and the City Engineer must approve the final design of all permanent facilities. Following the completion of the design work, the Public Works Department will install or will hire a contractor to install the permanent facilities.

Monitoring Traffic Conditions: No sooner than 180 days, but within one year of the completion of all permanent facilities, the Transportation Committee will evaluate conditions in the study area to determine the impact of the facilities

and their effectiveness and make adjustments as necessary. The Traffic Committee may extend the monitoring period when the initial results are inconclusive or when unanticipated changes in traffic conditions have occurred.

- *At any time, the City Manager, City Engineer, or the Traffic Committee may order modifications to or removal of an approved NTC device if they make a determination that the device is creating a hazardous condition.*



Goals for Completing the Process: The length of time it will take to adopt and carry out an NTC Action Plan may vary significantly depending on a number of factors including:

- The geographic size of the study area;
- The number of households involved;
- The types of streets impacted;
- The type and complexity of the problem;
- The type and complexity of the solution;
- The availability of the Transportation Staff to manage the effort based on their workload.

In consideration of these factors, the flow chart on pages 17 and 18 includes goals for completing the major components of the process described in

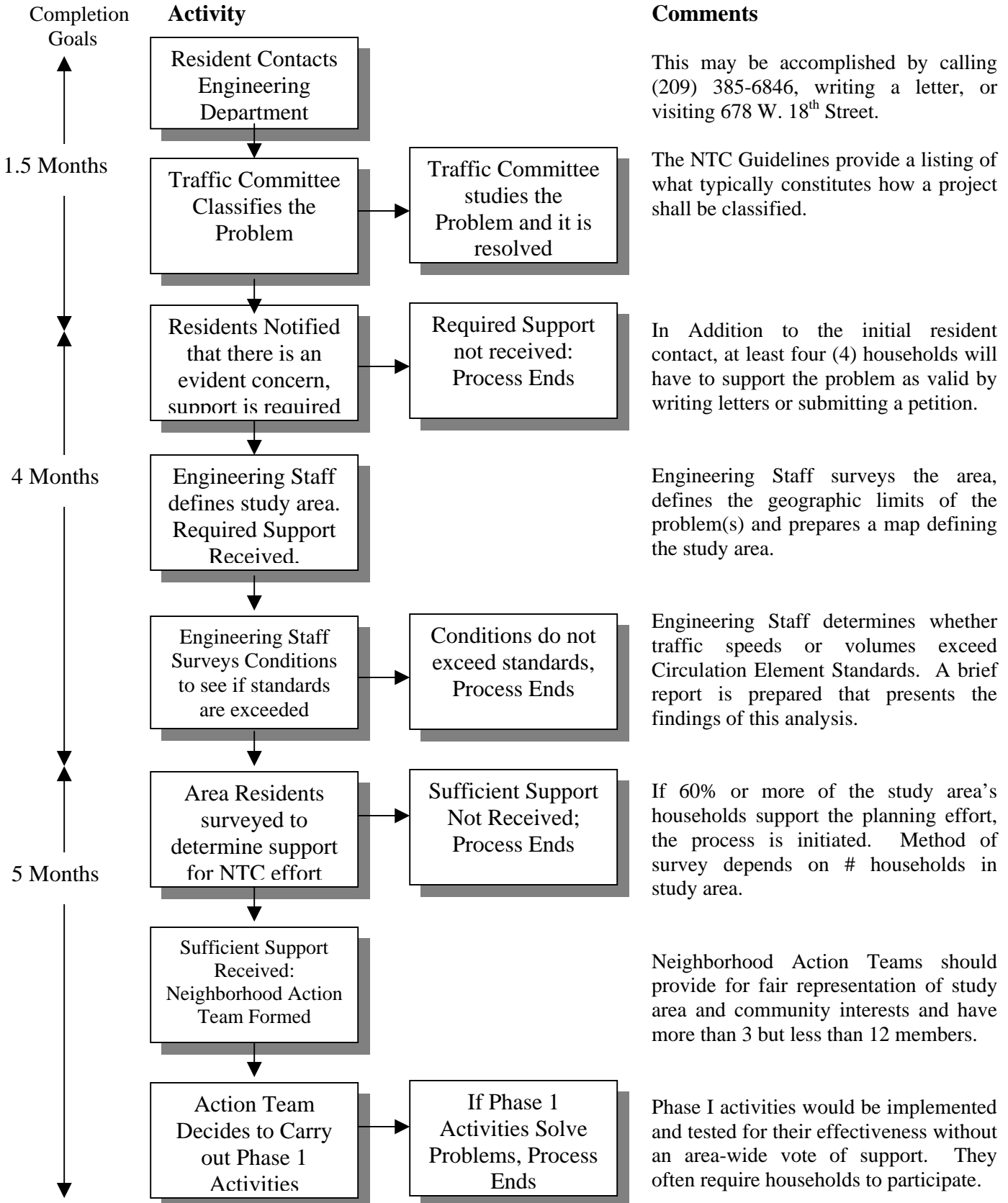
these guidelines. Actual times may vary significantly.

Removing or Significantly Modifying Permanent Facilities:

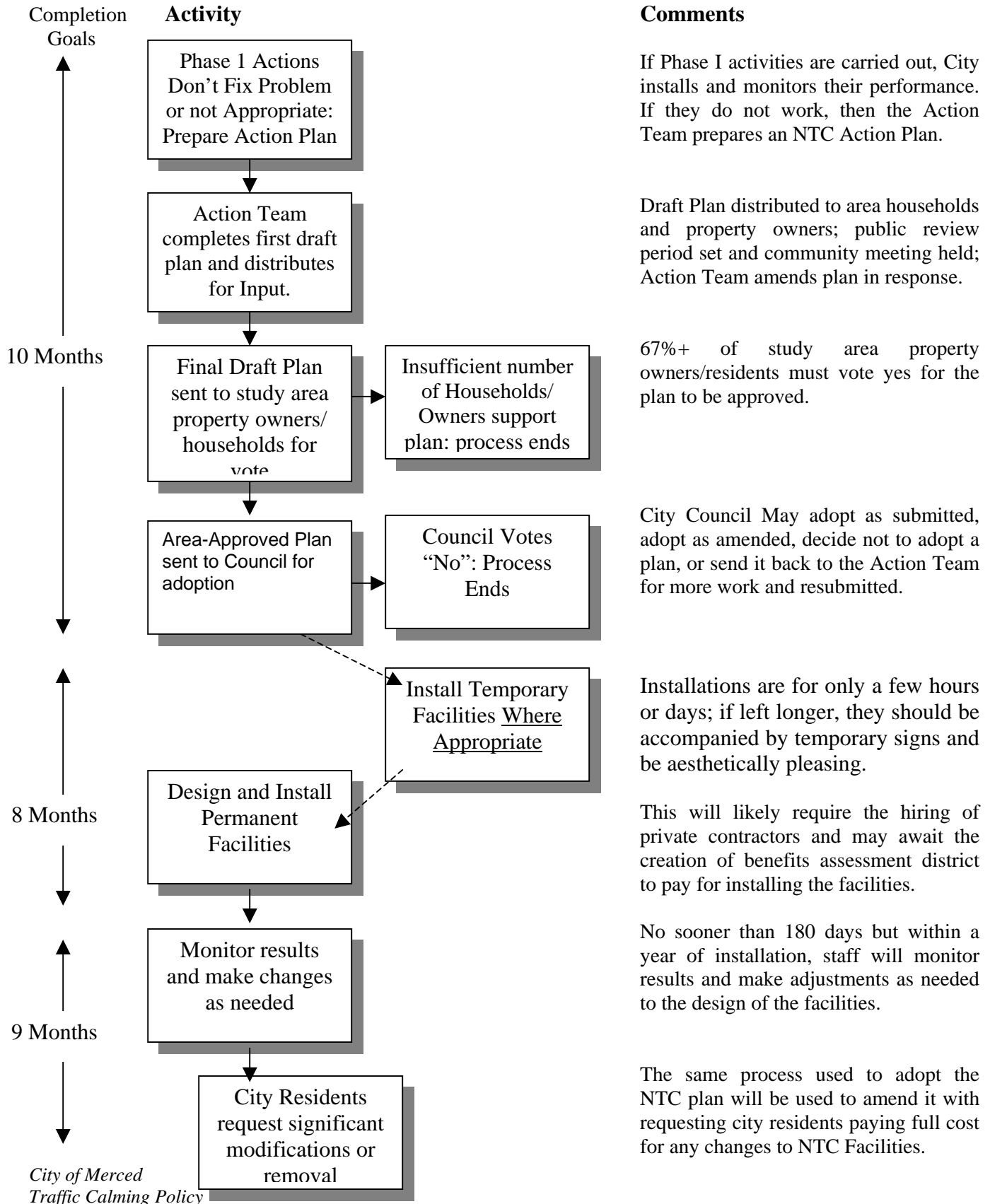
At any time after the completion of the monitoring period described above, any city resident may request that permanent NTC facilities be modified or removed. These requests will be handled as follows:

- *The concerned city resident must fill out a Citizen Action Request Form – a sample copy is included in Appendix A on page 31 of this document.*
- *The Traffic Committee will review the request and determine whether it can be accomplished without changing the adopted NTC Action Plan. If it can be accomplished without amending the plan, the Committee may order the changes.*
- *Requested changes that require amendment to the adopted NTC Action Plan must follow the same process that adoption of the NTC Action Plan followed – beginning with the initial validation process. All voting and evaluation procedures will still apply.*
- *City residents requesting significant modifications to or removal of permanent facilities will be responsible for the full cost of these actions, including any restoration required to streets or related pedestrian, bicycle or drainage facilities. An appropriate percentage (minus maintenance) shall be reimbursed to the individuals whom paid for the installation of the device.*

Summary of Neighborhood Traffic Calming Guidelines Process:



Summary of NTC Process: Local and Residential Collector Streets (Continued)



The Neighborhood Traffic Management Toolbox

What is an NTC Tool? A NTC *tool* is a physical device (such as a speed hump or traffic circle) or an activity (such as police enforcement) that alters the driving behavior of motorists. This chapter describes the various types of NTC tools that may be used in Merced to resolve or reduce NTC problems.

Drawers in the Toolbox. The NTC toolbox is summarized on Figure 2 on the following pages. Applying the right tool or combination of tools to an NTC problem requires an understanding of the primary *purpose* and *effectiveness* of each tool. Therefore, we have arranged our toolbox into “drawers” based on the primary purpose of a particular device:

- The Speed Control Drawer
- The Volume Control Drawer
- The Safety Drawer
- Other Complementary Tools

There is overlap between these drawers. For example, a device that slows traffic down may also reduce traffic volumes and vice-versa. Figure 2 provides a qualitative assessment of how each tool impacts traffic volumes and speeds.

The Right Tool for the Right Type of Road. This program applies to Residential Collector or Local streets. But not all tools are appropriate for all types of Residential Streets. For example, closing a street by installing a barricade is not appropriate for Residential Collector Street because it would conflict with the basic *purpose* of this street, which is to handle some level of through traffic. Therefore, Figure 2 identifies the types of residential streets where each specific tool may be used.

Other Limits on Applying Particular Tools. Particular physical setting or traffic conditions in the area may limit selecting the right NTC tool. For example, speed cushions should not be allowed on primary access routes for emergency vehicles. These types of limitations that apply to the use of a particular tool are noted on Figure 2.

Design Principles. It is not possible to identify all desired design features of a particular tool in these guidelines. However, there are some features of a particular tool that may be needed to make them more effective or to provide for desired types of access. For example, medians installed in the center of streets should include *mountable curbs* at key locations so that emergency vehicles can drive across them. Figure 2 identifies these particular design features.

Will the NTC Design interfere with Emergency Response Time?

Currently, there no designated response routes within the City. However, the City will not approve the installation or operation of Traffic Calming devices along Arterial or Major Collector Roadways due to the need of ensuring proper Emergency Response times. The City will not support the installation or implementation of any Traffic Calming Device that significantly reduces emergency response times.

Is the NTC Design ADA Compliant?

Each device that is installed will need to be reviewed to ensure that it is ADA compliant and meets all state and local codes for compliancy. Each device shall provide ADA accessibility where it doesn't exist or maintain accessibility where it does exist.

Figure #2: City of Merced’s NTC Toolbox (April 2007)

Device/Activity	Description	Reduce Volume (1)	Reduce Speed (1)	Apply to Street Type (2)		Other Application Limits	Design Principles	Candidate Temp. Activity/Facility
				RL	RC			
The Speed Control Drawer								
Speed Trailer	Illuminated display shows speed of passing motorists	No	Varies	Yes	Yes	Typically use in combination with other NTM devices/activities		Yes
Speed Alert Program	Residents use radar to clock speeds & motorists receive notice in mail	No	Varies	Yes	Maybe	See guidelines section & Appendix E.	See appendix for program details	Yes
Pavement Striping/Marking	Alert motorists to special conditions	No	Possible	Yes	Yes			No
Stop Signs	Used to manage traffic flow at intersections	Seldom	Varies	Yes	Yes		See Appendix F for installation procedure	No
Speed Cushions (5 to 10 cm high & 3.7 m wide)	Raised sections of roadways with curved transitions.	Possible	Yes	Yes	Maybe	Prohibited on primary emergency access routes. (3)	Cushions should stop at edge of asphalt and be installed in series.	No
Speed Table (7-10 cm high and 6.7 m wide)	Speed humps with long flat sections	Possible	Yes	Yes	Yes	Prohibited on primary emergency access routes.	Tables should stop at edge of asphalt.	No
Traffic Circles and Roundabouts	Raised devices in an intersection that direct traffic into a circular pattern	Possible	Yes, close to circle	Yes	Yes		Where located on a designated bikeway, ensure enough room for bikes & cars to drive past. Install in series.	Yes
Parking Arrangement	Arrange curb parking to narrow roadway	Possible	Likely	Yes	Yes			No
Textured-Colored Pavement	Special markings and composition to alert drivers to special conditions	Not Likely	Possible	Yes	Yes		Care should be taken in selecting materials so that resultant tire noise is not a problem for nearby residents.	No
Mid-Block Slow Points, Chicane	Curbs that protrude into road that leave a single lane or narrow two lanes	Yes	Yes	Yes	Maybe	Prohibited on primary emergency access routes.	Allow two narrow travel lanes to pass by with “cut throughs” if on a designated bikeway.	Yes

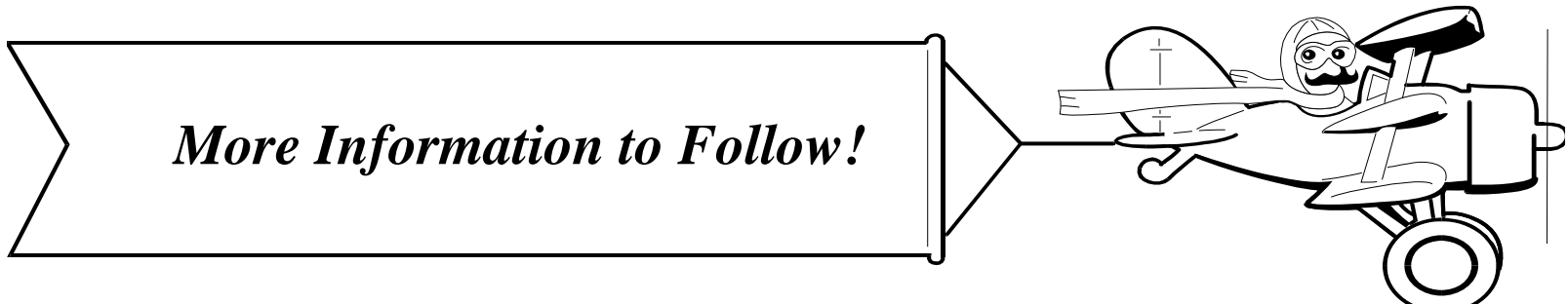
(1) The source of these qualitative ratings is taken from *A Guidebook for Residential Traffic Management*, Final Report, December 1994, Washington State Department of Transportation
 (2) **RL** = Residential Local **RC** = Residential Collector
 (3) **Primary Emergency Access Routes** are those listed in Appendix D on page 40 of this document

Device/Activity	Description	Reduce Volume (1)	Reduce Speed (1)	Apply to Street Type (2)		Other Application Limits	Design Principles	Candidate Temp. Activity
				RL	RC			
Meandering Street Design	Shift curb parking from one side of street to another to create non-linear alignment	Likely	Possibly	Yes	Maybe	Don't install where more than 70% of the curb areas on both sides of the street are used for p.m. resident vehicle parking	Protect parking bays with curb extensions at shift points whenever possible.	No
Raised Intersection/Sidewalk	Raised areas covering an entire intersection, with ramps, brick or other textured materials on the flat section.	Possible	Yes	Yes	Yes	May be allowed on primary emergency access routes.	Should include all areas of an intersection: inclusive of crosswalks and possibly the turning lanes	No
Mixture of -Devices:	Residential area where street is extension of front yard and roadway is shared by motorists, pedestrians and bicycles.	Yes	Yes	Maybe	No	Only <i>consider</i> on low-volume local streets (less than 200 vehicles per day) with resident support and financial participation.	Will require a comprehensive custom design of facilities.	No
The Volume Control Drawer								
Turn Prohibition Sign	Regulatory sign at intersection	Yes	Likely	Yes	Yes			Yes
One-Way Streets and Signs	Establish one-way traffic pattern	Likely	Possible	Maybe	Maybe	Don't use on designated bikeway unless parallel route of equal quality available		No
One-way Entry-Exit Chokers, Half Closures, Semi-Diverters	Barrier to traffic in one direction which permits traffic in the opposite direction to pass through	Possible	Yes	Yes	Maybe	Prohibited on primary emergency access routes.	Provide for through bike passage.	Yes
Forced Turn Islands, Barriers, & Channelization	Prevents traffic from making turns at an intersection	Yes	Likely	Yes	Yes		Require mountable curbs to enable emergency vehicle crossing.	Yes
Median Barriers	Barrier in center of road that prohibits left turns or cross traffic	Yes	No	No	Maybe		Require mountable curbs to enable emergency vehicle crossing.	Yes
Expanded Landscaped Parkways	Remove curb parking along street and install landscaped parkways	Yes	No	No	No			
Diagonal Diverters	Barrier placed diagonally across an intersection to force drivers to turn	Yes	Likely	Yes	No	Prohibited on primary emergency access routes.	Provide for through bike passage.	Yes
Street Closures	A complete barricade of a street at an intersection or creating a cul-de-sac	Yes	Yes	Yes	No	Prohibited on primary emergency access routes.	Must provide adequate turn around area consistent with City standards.	Yes

Device/Activity	Description	Reduce Volume (1)	Reduce Speed (1)	Apply to Street Type (2)		Other Application Limits	Design Principles	Candidate Temp. Activity
				RL	RC			
The Safety Drawer								
Truck Prohibitions	Regulatory signs at intersections	Minor	No	Yes	Yes	Not installed on designated truck routes		No
Enforcement (Visible & active police presence)	Emphasize patrols on specific corridors	Not Likely	Very Temporary	Yes	Yes	See guidelines section and appendix	See appendix	Yes
Marked Crosswalks	Painted pedestrian crossing areas.	No	No	Yes	Yes			No
Bicycle Lanes	Lanes in the road reserved for bicycles	No	No	No	Maybe		Meet minimum design standards of Bike Plan	No
Curb Extensions (at entries or exits and at mid-block locations)	Extend curb into road to create narrower crossing or protect parking bay	No	Slight	Yes	Yes		On designated bike routes, ensure that there is enough room for bikes and cars to comfortably pass	Yes
Raised Crosswalk	Similar to a Speed Table with marked crosswalk.	Possible	Yes	Yes	Yes	Prohibited on primary emergency access routes.	Crosswalk flush with top of curb with markings	No
Median-Entry/Exit Islands (with or without signage)	Islands that narrow road at entry/exit points	Possible	No	Yes	Yes		May need to use mountable curbs to accommodate emergency vehicles	Yes
Median Mid-Block Islands	Creates a narrower road and provides a pedestrian refuge	No	Slight	Yes	Maybe			Yes
Raised Intersections	An entire intersection in the roadway is raised to sidewalk level with ramps on all approaching streets	Possible	Yes	Yes	Yes		Ensure that ramps are gentle enough to accommodate large emergency access vehicles.	No
Neighborhood Traffic Safety Campaign	Distribute information to neighborhood and/or City residents	No	Not Likely	Yes	Yes			No
Traffic Signals	Standard signal design used throughout SLO	Seldom	Varies	No	No	Consider installation only at intersections where conditions meet warrants set forth in the <i>Caltrans Design Manual</i>		
Video Enforcement At Signalized Intersections	Cameras record motorists who fail to stop & citations issued.	No	Possible, close to intersection		Yes			No

Device/Activity	Description	Reduce Volume (1)	Reduce Speed (1)	Apply to Street Type (2)		Other Application Limits	Design Principles	Candidate Temp. Activity
				RL	RC			
Other Complementary Tools								
Landscaping	Landscaping that emphasizes the area's residential character and visually narrows the roadway.	No	No	Yes	Yes	Use to complement other NTM devices/activities to reduce speed.		No
Neighborhood Entry Signs	Example: Signs that alert motorists that they are entering a residential area to drive carefully	No	No	Yes	Yes			No
Speed Limit Signs	"25 mph in residential areas" etc.	No	No	Yes	Yes	Use in combination with other NTM devices or activities that reduce speed.		No
Novelty Signs	"Slow, Quiet Neighborhood Ahead" etc.	No	No	Yes	Maybe			No
Special Pavement Markings - Striping and Color	Special markings at entries or crosswalks to alert drivers to special conditions	No	Possibly	Yes	Yes			No
Rubberized Asphalt Overlays	Install rubberized paving material to reduce traffic noise.	No	No	No	maybe			
Neotraditional Neighborhood Design	Integrated land use and transportation design to increase transit and non-motorized travel	Likely	Likely	Yes	Yes	Generally apply concepts to newly developing neighborhoods and to older areas with grid-pattern streets.		No

(1) The source of these qualitative ratings is taken from *A Guidebook for Residential Traffic Management*, Final Report, December 1994, Washington State Department of Transportation
 (2) **RL** = Residential Local **RC** = Residential Collector
 (3) **Primary Emergency Access Routes** are those listed in Arterial Roadways with the *Merced 2015 General Plan*



What if A Device is Not Listed? The Traffic Committee or an Action Team may *propose* to use devices or activities that are not listed on Figure 2. These proposals must be carefully evaluated by the Traffic Committee and approved by the Engineering Department prior to being included in a NTC Action Plan. All devices still must be an approved traffic control device per state standards.

As part of staff’s evaluation, “trial periods” may be employed to test the effectiveness of unlisted devices or activities. If possible, the device will be installed using inexpensive temporary materials (see previous section that describes temporary facilities).

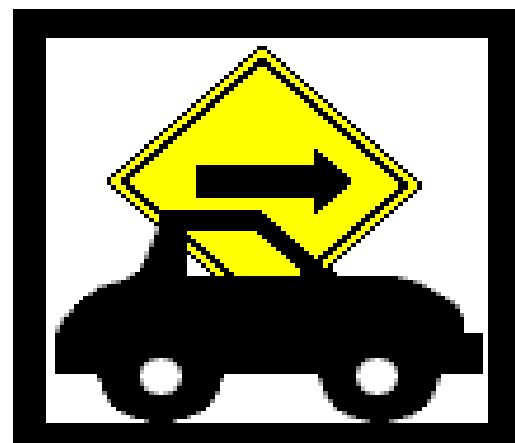
At the end of the trial period, the Transportation Committee will evaluate the device’s performance and the Engineering Department will decide whether it will can be included in the NTC Action Plan and installed as a permanent device.

What About Deviations to These Guidelines? The Engineering Department may approve the use of a device or activity on a type of street shown by Figure 2 to be *ineligible* for such an application when it has been determined that:

- *After careful evaluation, other eligible NTC devices or activities are not physically feasible or cost-effective to carry out.*
- *The proposed device will not limit access by emergency vehicles or reduce bicycle or pedestrian access.*
- *The device will not reduce the designated function of the street as a Residential Collector or Local roadway.*

Factors to Consider When Selecting NTC Devices. Selecting the appropriate NTC tool or combination of tools should involve careful consideration of at least the following factors:

- **Effectiveness:** *Is it reasonable to expect that the tool will solve the problem or significantly reduce its severity?*
- **Environment:** *Does the tool or combination of tools maintain or enhance the character of the residential area?*
- **Unacceptable Impacts or Secondary Impacts:** *Will the application of NTC tools create problems in the study area or outside the study area that are likely to be unacceptable to the neighborhood or the community?*
- **Cost:** *Is the overall cost of the tools affordable to those that have to pay for them?*
- **Cost-Effectiveness:** *Does the selected solution provide the highest benefit for each dollar spent? Or are there other solutions that have a better cost-effectiveness ratio?*



More Design and Application Principles for NTC Facilities. Figure 2 identifies some of the common concerns with designing NTC facilities. Action Teams, the Transportation Staff or consultants should consider the following principals when designing these facilities:

- ☺ **Visibility:** Facilities should be easily visible during day and night. NTC facilities should not be placed where motorists do not have adequate stopping sight distances for the desired design speed.
- ☺ **Signage:** Advance signs should warn motorists of upcoming NTC devices and, to the extent possible, guide the motorist’s response to the device. For example, a “curve” sign should be placed upstream from a diagonal diverter.
- ☺ **Streetscape:** NTC facilities should be designed to enhance the appearance and “feel” of the street. They should alert drivers that they are in or entering a residential area.
- ☺ **Landscaping:** Whenever possible, NTC facilities should be landscaped in ways that ensure that:

- Landscaping does not block vehicle or pedestrian sight lines or hide pedestrians.
- Landscaping does not block lighting of NTC facilities.
- Irrigation and services are provided that ensures that the landscaping will be well maintained.

☺ **Design Vehicles and Modes:** All NTC facilities will be evaluated for their effect on emergency vehicle, transit, delivery and service vehicle, bicycle and pedestrian access to ensure that these modes are safely accommodated. The City Fire and Police Departments and, where applicable, the Parks Division of the Department of Public Works should be consulted during the design of NTC facilities.

Bicycle and pedestrian access should not be limited by the application of NTC devices. Where applicable, all devices shall comply with Americans With Disabilities Act (ADA) standards.

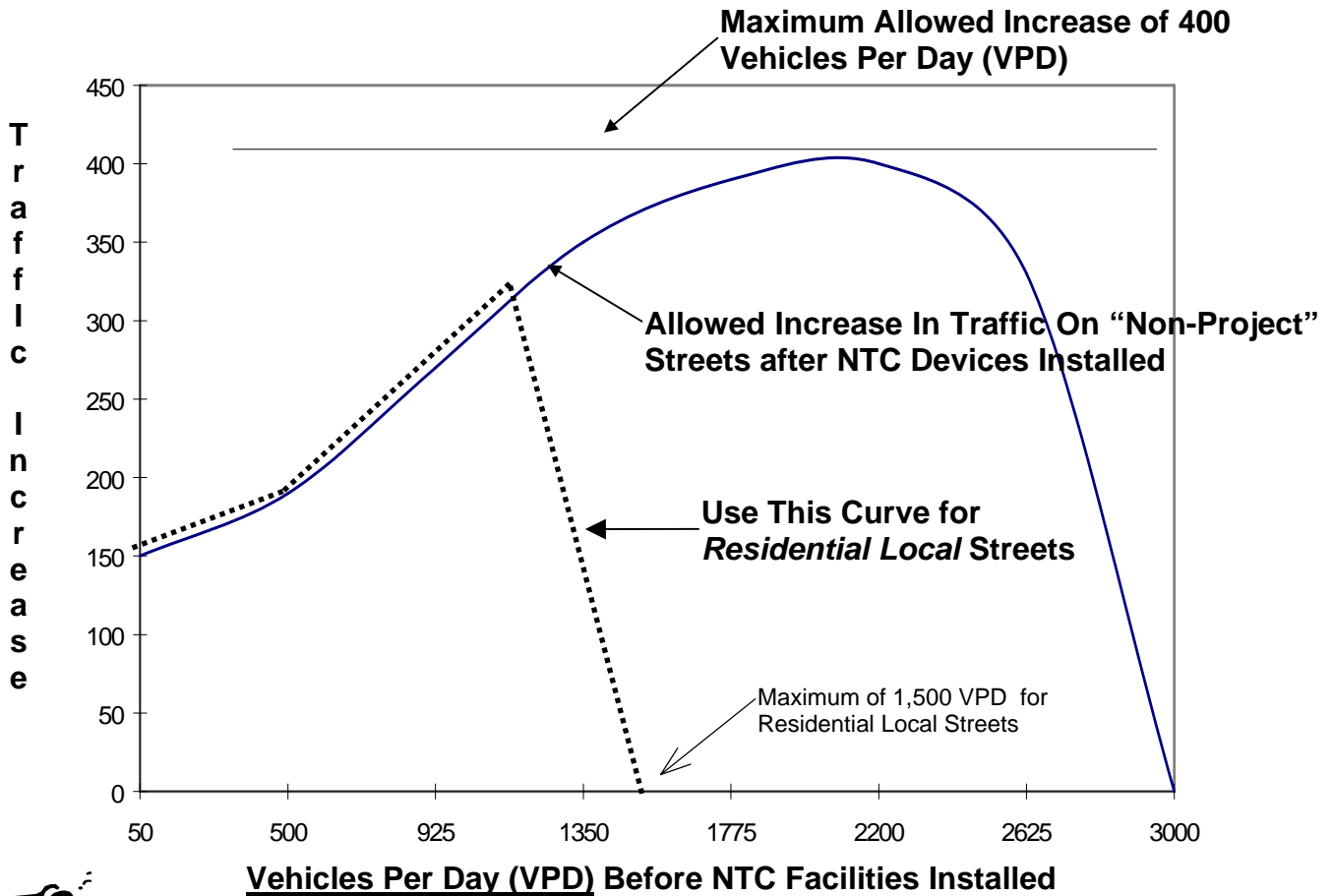
☺ **Maintenance:** The long-term maintenance costs should be anticipated in the design of the facilities and minimized to the extent possible.

☺ **Traffic Diversion:** The application of NTC devices should not divert traffic onto other Residential Collector or Residential Local streets that exceeds the diversion standards shown in Figure 3 on the following page.

For More Information about the design and effectiveness of particular NTC facilities or activities, see the appendix of this document or telephone the Transportation Staff at 385-6846.



Figure #3: Acceptable Increases in Traffic Volumes On Residential Collector & Local Streets



How to Use This Graph:

- First check Figure 1 on page 5 to see what the particular street is classified. For *Residential Local* streets, use the dashedcurve. For *Residential Collector* streets use the solid ____ curve.
- Along the bottom of the graph find the point on the scale that most closely represents the traffic level of the “non-project street” before the NTC devices were installed.
- From the point on the bottom scale, draw a vertical line until it intersects the curve. From this intersecting point, draw a horizontal line to the left until it intersects the vertical scale.
- Estimate the number on this vertical scale. This number is the number of *additional* vehicles per day that will be allowed on this particular street after the NTC devices have been installed.

NEIGHBORHOOD TRAFFIC CALMING PROGRAM ADMINISTRATION

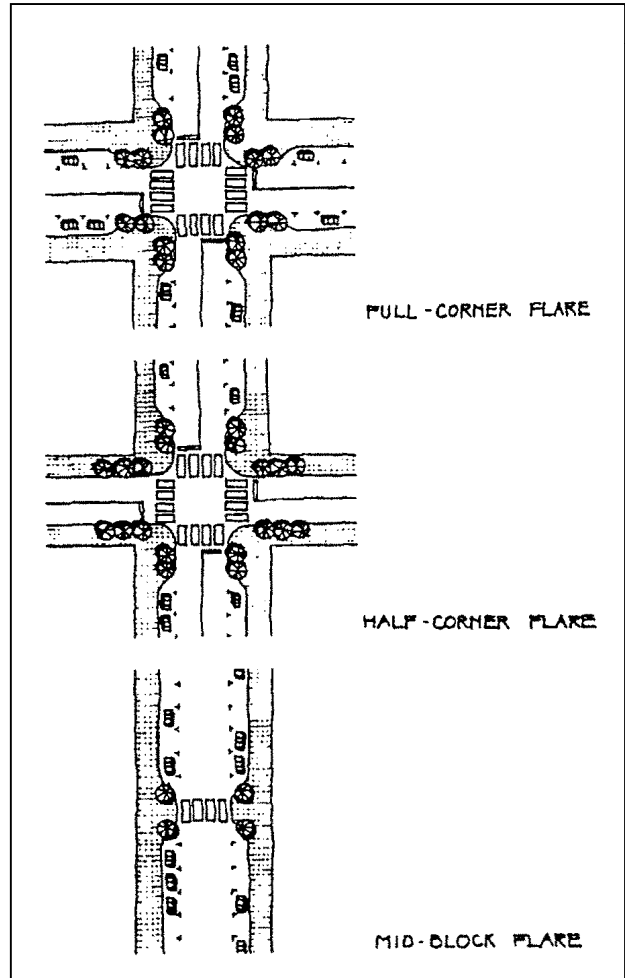
Responsibility. The City of Merced Engineering Department is responsible for administering these guidelines. This is part of the Department’s Traffic Committee program.

Staff members that will answer questions and provide assistance include the City Engineer and the Engineering Department’s staff. They may be reached at 678 W. 18th Street, Merced, California 95430, Telephone (209) 385-6846, FAX (209) 725-8775.

Guidelines Amendments. Any resident of the City of Merced may request that these guidelines be amended. A letter describing in detail the proposed amendment and the rationale for it should be submitted to the Transportation Committee at the address shown above. The Engineering Department may charge a fee to cover the administrative cost of processing amendment requests.

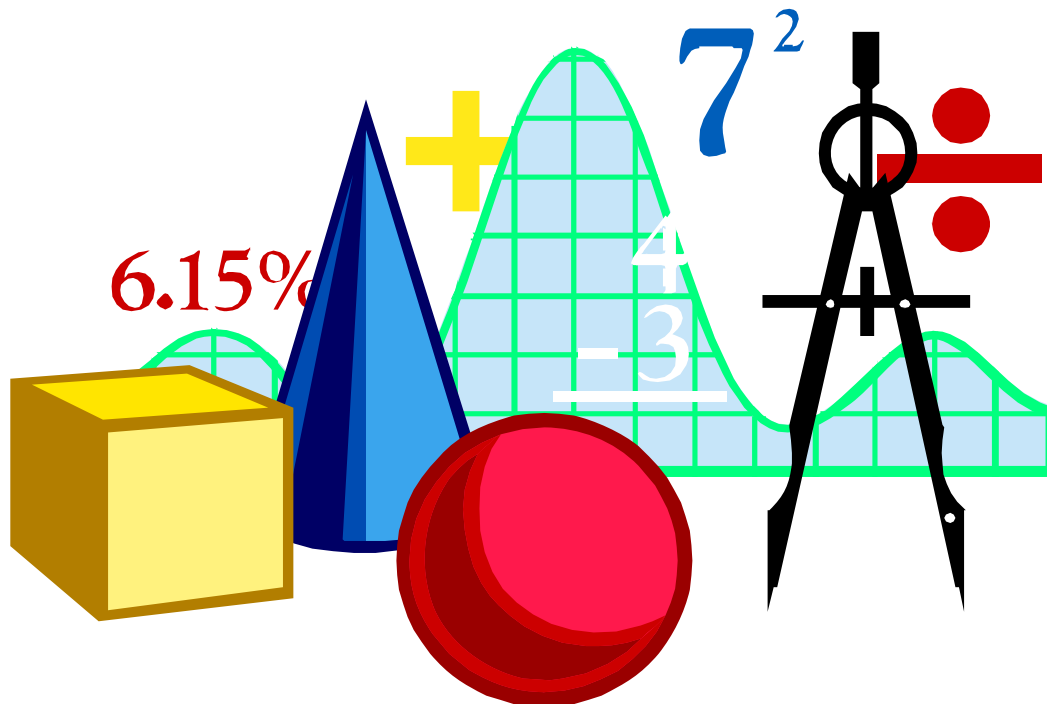
The City Council is responsible for considering all amendment requests at advertised public hearings.

Appeals of decisions made as part of this NTC Program shall be made in writing to the City of Merced’s City Council. Appeals must be filed with the Engineering Department, 678 W. 18th Street and will be considered by the City Council at an advertised public hearing.



APPENDIX

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APPENDIX A: Glossary of Terms

Circulation Element: The City of Merced's long-range plan for addressing transportation needs within the community.

City Engineer: The director of the City of Merced Department of Engineering Department who is responsible for making decisions concerning the application of these guidelines.

Complementary NTC Tool: A device or activity that, by itself, does not significantly alter motorist's driving behavior but, in combination with other tools, can have a positive effect.

Eighty-Fifth Percentile Speed: Eighty-five percent (85%) of the vehicles using a street are traveling *at or below* this speed.

Excessive Traffic Speed or Volumes: Speeds or traffic volumes that exceeds City Standards and establish mechanisms that discourage pass-through traffic.

Focused Police Enforcement: The use of existing City Police personnel and equipment to enforce the posted or prima facia speed limit along a street segment for a specified period of time – generally less than one month. The purpose of this effort is to demonstrate the City's resolve to control speeds and to modify motorist behavior along a particular street corridor.

Household: The set of people residing at a single street address. The number of households in a study area is equal to the number of street addresses in that area.

Initial NTC Activities: Less-aggressive measures employed to solve or reduce the severity of a large-scale traffic problem in neighborhoods.

Large-Scale NTC Problems: Excessive traffic speeds or volumes that affect long segments of a residential street, multiple intersections, or a number of streets within a particular residential area.

Neighborhood Speed Watch Program: A program undertaken by neighborhood residents to encourage speeding motorists to slow down. Residents would be trained by City staff to use monitoring equipment to detect speeding motorists and note their license numbers. From this data, the City would determine the registered owner of the vehicle and send a communication warning the owner about speeding in residential areas and encouraging compliance with residential speed limits. These programs are implemented for a specified period of time and vehicle speed conditions monitored to determine their impact.

Normal Safety Concern: An everyday traffic anomaly that the public believes should be examined for installation of traffic calming devices.

NTC: An abbreviation for *Neighborhood Traffic Calming*.

NTC Action Plan: A plan developed by an Action Team and adopted by the City Council that identifies the types of devices and activities that will be employed to address neighborhood traffic problems.

Neighborhood Action Team (Action Team): A group of neighborhood residents and City staff members organized to assess large-scale NTC problems and to develop an NTC Action Plan.

Non-Project Streets: Residential Collector or Local streets within or adjoining an NTC

Study Area where NTC tools *have not* been installed.

NTC Tool: A device or activity that alters the driving behavior of motorists.

Permanent NTC Facility: A device permanently installed within a public street right-of-way or easement to alter the driving behavior of motorists.

Primary Emergency Access Routes: Arterial Streets & other major roadways within the City that are used as primary access routes by the City of Merced Fire Department.

Residential Collector Street: A road that collects traffic from residential areas and channels it to arterial streets.

Residential Local Street: A road that directly serves residential development that fronts it and channels traffic to residential collector streets.

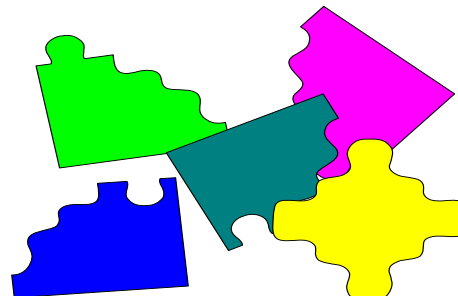
Sight-Distance Problems: These problems occur when the movement of pedestrians, bicyclists or motorists is impaired because of restricted visibility. Examples might include motorists that are unable to comfortably stop at a traffic signal because it is not visible soon enough based on the design speed of the street. Or motorists pull up to an intersection and cannot easily see cross traffic because a hedge or fence obscures their view.

Study Area: An area defined by the City's Transportation Staff that encompasses properties that are impacted by large-scale NTC problems.

Temporary NTC Facility: Using inexpensive temporary materials, a device installed in a public street right-of-way or easement for the purpose of testing its effectiveness in modifying the driving behavior of motorists.

Temporary Speed Trailer: Upon request by local residents or the Transportation Staff, the Police Department will park the speed trailer at desired locations for a specified period of time. The speed trailer posts the area's speed limit and displays the speed of approaching vehicles. The purpose of this device is to enable motorists to compare their vehicle's speed with the posted speed limit and to encourage them to slow down when necessary.

Traffic Safety Campaign: Written materials prepared by the City and edited by a Neighborhood Action Team that would be sent to study area households and surrounding residents. The materials would encourage compliance with speed limits and foster driving habits that promote safety and consideration for residential quality-of-life values. City-wide distribution of more general information may also be considered.



APPENDIX B: Sample Citizen Action Request Form

City of Merced

RQ #:

Citizen Action Request Form: Neighborhood Traffic Calming

Contact Person: _____	Day Phone: _____
Address: _____	Today's Date: _____
Location of Concern: _____	
Describe Concerns At This Location: _____	
For Official Use Only	
Project #: _____	Date Received: _____
	Date Field Inspected: _____
Field Inspection Results: <input type="checkbox"/>	
Date Response To Contact Person: _____	Resolution of Concern: _____
Date Completed: _____	

Traffic Engineer's Signature or Designee

Date:

APPENDIX C.1: Sample Petition Form

City of Merced

Neighborhood Traffic Calming

Petition to Support the Preparation of an Action Plan

Instructions. Residents within your neighborhood have identified traffic problems that they feel should be addressed. These concerns are briefly described below. If you support the preparation of a plan to address these problems, you should sign this petition. Only one person per household (per street address) should sign. If you want to be a member of a *Neighborhood Action Team* that will help prepare the Plan (4 to 11 volunteers from your neighborhood), check the box next to your signature. If a plan is developed to solve traffic problems in your neighborhood, you will be asked to help pay for the solutions.

Summary of Concerns. Residents in your neighborhood have identified the following traffic-related problems:

	Print Name	Resident Address	Signature	Yes, I am interested in being on a team to prepare a plan of action. (Provide Telephone #)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

APPENDIX C.2: Sample Ballot Form City of Merced

Neighborhood Traffic Calming Ballot for Supporting the Preparation of an Action Plan

Instructions. Residents within your neighborhood have identified traffic problems that they feel should be addressed. These concerns are briefly described below. Please check the appropriate boxes below. Only one person per household (per street address) should submit this ballot. If a plan is developed to solve traffic problems in your neighborhood, you *may* be asked to help pay for the solutions. The deadline for returning this ballot is _____.

Summary of Concerns. Residents in your neighborhood have identified the following traffic-related problems:

Please check the appropriate boxes:

YES, I support the preparation of a *Neighborhood Traffic Calming Plan* to address traffic problems in my neighborhood.

YES, I am interested in being a member of a *Neighborhood Action Team* to help prepare the Plan (made up of 4 to 11 volunteers from your neighborhood).

Name (Please Print)	Address	Telephone #
---------------------	---------	-------------

NO, I do not support the preparation of a *Neighborhood Traffic Management Plan*.

Your Name: _____

Street Address: _____

Please Return This Ballot to:

**City of Merced
Attn: Engineering Department
678 W. 18th Street
Merced, CA 95340**

APPENDIX C.3: Sample Ballot Form

City of Merced

Neighborhood Traffic Calming Plan

Ballot for Approving or Not Approving an Action Plan

Instructions. Several months ago with the support of your neighborhood, residents in your area formed a Neighborhood Action Team for the purpose of preparing a plan to address traffic problems. The Action Team has completed a plan that is attached to this ballot. Please carefully review the Plan (including provisions that describe how facilities will be paid for) and check the appropriate boxes below. If approved by 67% or more of the households, the Plan will be put to a vote before the City Council and, if approved, carried out by the City. The deadline for returning this ballot is _____.

Please check the appropriate box:

[] YES, I support the Plan as presented.

[] NO, I do not support the Plan as presented.

[] NO, I do not support the Plan as presented. However, I would support it if the following changes were made (please print clearly and attach additional pages as needed):

Your Name: _____

Street Address: _____

Please Return This Ballot to:

City of Merced
Attn: Engineering Department
678 W. 18th Street
Merced, CA 95340

APPENDIX D: Primary Emergency Response Routes**

(See Accompanying Map on Page 36)

Major Transportation and Other Roadways

Street	From	To
R Street	Childs Avenue	Lehigh Drive
M Street	Childs Avenue	Bellevue Road
G Street	Mission Avenue	Farmland Avenue
Parsons Avenue	Coffee Street	Cardella Road
Mckee Road	Santa Fe Drive	Yosemite Avenue
Mission Ave/Dickerson Ferry	Miles Road	Thornton Road
Thornton Road	Dickerson Ferry Road	Highway 140
Highway 59	16 th Street	Bellevue Road
Highway 59	Mission Avenue	Childs Avenue
Martin Luther King Jr. Way	Childs Avenue	21st Street
Highway 140	V Street	Thornton Road
Childs Avenue	Kibby Road	West Avenue
16 th Street	Highway 140	Ashby Road
North Bear Creek Drive	Highway 140	McKee Road
South Bear Creek Drive	G Street	Mckee Road
Olive Avenue	Highway 59	Mckee Road
Cardella Road	Highway 59	Parsons Avenue
Bellevue Road	Highway 59	Lake Road
Yosemite Avenue	Highway 59	Lake Road
Campus Parkway	From Mission Interchange	Hwy 140
Coffee Street	Baker Drive	Parsons Avenue
Yosemite Parkway/Hwy 140	16 th Street	Kibby Road
Glenn Avenue	Yosemite Parkway	S. E. Bear Creek Drive
V Street	West Avenue	24 th Street
21 st Street	M Street	Yosemite Parkway
Gerard Avenue	West Avenue	Tower Road
Buena Vista Drive	Highway 59	Campus Drive
West Avenue	Lopes Avenue	Childs Avenue

**** Source:** Circulation Element, City of Merced, April 1997.

Emergency Response Routes include, but are not limited to those shown above. The above list may be expanded as warrants are met or needs arise. For a complete list of the City of Merced’s Arterial Roadways, please refer to Chapter 4 (Circulation Element) of the Merced Vision 2015 General Plan.

A map will be included that highlights the routes identified in the preceding table. All other streets will be “screened back” to reduce their emphasis.

Note: graphic has been requested from Engineering Staff

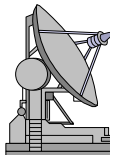
APPENDIX E: Guidelines For Establishing Neighborhood Speed Watch Programs

Neighborhood Speed Watch Programs are undertaken by neighborhood residents to encourage speeding motorists on *Local* and *Collector* streets to slow down. They may be employed where:

- The 85th percentile speed along these streets are within 10 mph of the 30 mph standard called for by the Circulation Element; and
- It is estimated that more than 50% of the speeding motorists are from within the study area.

These programs are implemented for a specified period of time and vehicle speed conditions monitored to determine their impact. They are not intended as permanent programs but may be used in combination with other Initial Activities to achieve desired NTC objectives.

- ❖ **Equipment:** *The City will loan a radar gun to residents interested in implementing a Speed Watch Program.. Since equipment is limited, its availability will depend on the number of Speed Watch Programs that are underway at any given time.*
- ❖ **Program Staffing:** *Area residents will be responsible for organizing volunteers to conduct all of the speed survey work, record the license plate numbers, and transmit data to the Police Department (385-6912) in a pre-established format for processing.*
- ❖ **Training:** *The Traffic Engineer or other qualified Transportation Staff will train residents (at a consolidated training session) on how to use the radar gun and on methods of surveying traffic and recording the license plate numbers.*
- ❖ **Contacting Violators:** *The Police Department will be responsible for determining the registered owners of speeding vehicles and sending them a communication that warns them that they are exceeding the speed limit and encourages them to comply.*
- ❖ **Relationship to Other Programs:** *Generally, the installation of a Temporary Speed Trailer (See Appendix A for description) should occur before a speed watch program is organized. If a speed watch is organized and the results show that most violators are from the immediate area, a Neighborhood Traffic Safety Campaign (see Figure 2) may also be warranted.*





APPENDIX F.1: Process for Requesting the Installation of a Traffic Calming on Local Residential Streets

- ❖ **Requesting Traffic Calming:** A residents or property owners may contact the City Engineer (Telephone 385-6846) and request the installation of a Traffic Calming Device(s). The Traffic Engineer will determine if the request is covered by the City's adopted policy – the request for traffic calming on a "*local street*" (as classified by the Circulation Element).
- ❖ After reviewing the City's policy and procedures with the person(s), if the person(s) wants to pursue traffic calming device(s) installation, the Engineer will provide him/her with an application. A complete application includes a copy of the City's traffic calming policy, a map (County assessors map or similar document) identifying properties within a *300-foot radius* of the proposed traffic calming device, blank petition sheets with standard heading, and information about the cost of installation.
- ❖ **Evaluating Traffic Warrants:** City Engineer or designee will review traffic conditions (if not already known) and will inform the applicant of the results of this analysis. When determining the need for traffic calming, the Traffic Engineer will rely on *warrants* (thresholds for certain types of traffic conditions) prescribed by the *California Department of Transportation Traffic Manual*. If these warrants are met (thresholds are exceeded), the Engineer will order the installation of the traffic calming device(s), at the applicant's, neighborhood's cost, or the City's (or any combination of) and will inform the citizens. If warrants are not met, the Engineer will inform the citizen and he/she may decide to proceed with the petition process.
- ❖ **Submitting A Petition:** The citizen is required to circulate the petition and submit the list of signatures to the Traffic Engineer. The engineer will compare the list of supporting households with properties shown on the survey map to determine the level of support. At least 67% of the households must support the installation of the traffic calming device(s) before the Traffic Engineer will approve the installation.
- ❖ **Paying for Traffic Calming:** If the 67% support level is attained, the citizens will be asked to deposit an *application fee* (a non-refundable fee of \$150.00 for each traffic calming device proposed, plus a 10% administrative fee). Once the traffic calming device(s) is approved, the residual amount for installation of the traffic calming device will be required at that time. If the applicant's cannot afford the approved device(s), an alternative payment program between the City and individuals in favor of the device(s) can be reviewed by the City Council for approval.

If the 67% level of support is not attained, the applicant will be notified that the process is terminated unless they can get additional support.

APPENDIX F.2: Traffic Calming Request

City of Merced

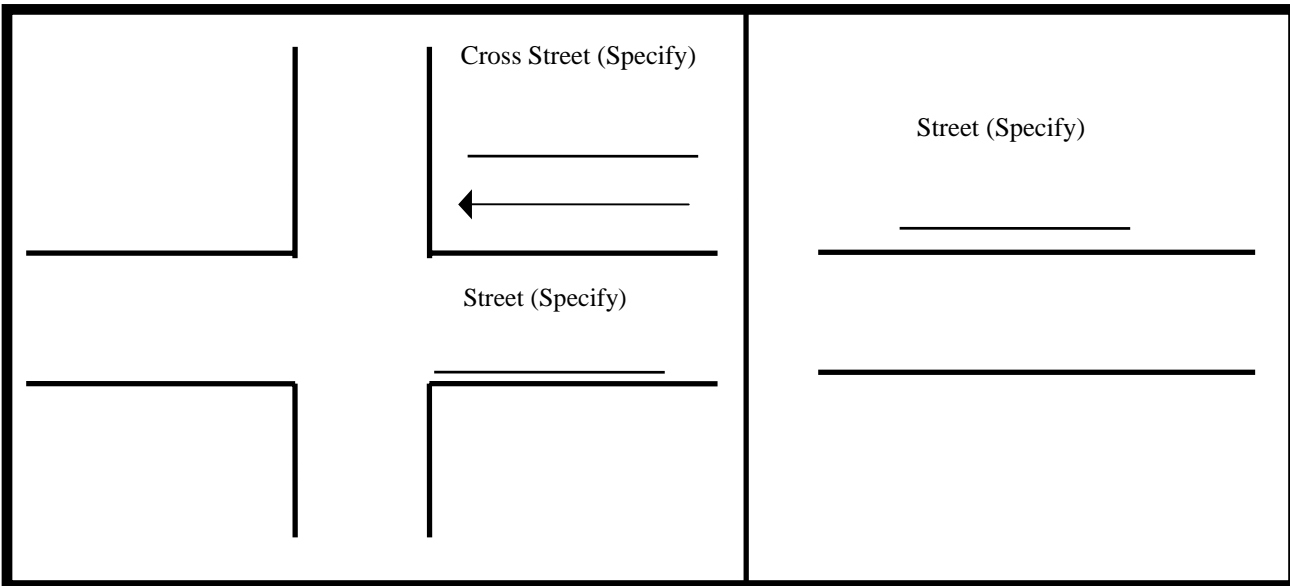
RQ #: _____

Citizen Action Request Form: Traffic Calming Installation

Name of Applicant requesting the Traffic Calming Device(s): _____

Home Address: _____ Telephone: _____

Describe which street or streets are to be stopped and show location(s) on attached map:



Applicant's Statement: I have reviewed the attached materials and understand my responsibilities for having a traffic-calming device(s) installed at the requested location.

Signature _____

Date: _____

Attached Information for Applicant's Use:

- Outline of Installation Procedures
- Sample Petition Form
- Map Showing Required Petition Area
- Copy of Adopted City Traffic Calming Policy
- Other: _____

Date received by
 Engineering Department: _____
 678 W. 18th Street
 Merced, Ca 95340

APPENDIX F.2: Sample Petition for Traffic Calming Installation

Traffic Calming

Location: _____

Petitioners Statement: I support the installation of a Traffic Calming Device or Devices at the locations shown on the attached petition map. I realize that I may be required to pay for the installation of this(ese) device(s). (Note: only one signature per household is required.)(*)

#	Print Name	Home Address	Signature	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

*Must be a registered voter or over the age of 18

Appendix G: Other Related Neighborhood Problems

Related Issue	Contact Agency	Telephone Area Code (209)
There is landscaping or other obstacles in the public right-of-way that make it difficult for motorists to back out of driveways onto the street.	Building and Safety Division	385-6861
Vehicles are parked along the curb (cars, trucks, RVs, boats, etc.) for more than three days (72 hours) without being moved.	Merced Police Department	385-6912
Vehicles parked along the wrong side of the street	Merced Police Department	385-6912
There are disabled vehicles; people are parking cars in their front yard.	Merced Police Department/ Code Enforcement	385-6912 385-6854
People are using a recreational vehicle as a residence.	Code Enforcement	385-6854
A garage has been converted to a residence and may be illegally occupied.	Building and Safety Division; Planning	385-6861 385-6858
Large delivery trucks passing through an area seem to be using a particular street that is not a designated truck route.	Merced Police Department	385-6912
The roadway, curbs, sidewalks, signs or pavement markings are damaged or missing and need to be repaired.	Public Works Department	385-6800
People who do not live in a neighborhood are using most or all of the on-street vehicle parking (possible candidate areas for creating a neighborhood parking district).	Engineering	385-6846

APPENDIX H: Council Resolution Establishing Traffic Calming Device Installation Policy

RESOLUTION NO. 07-__ (2007 Series)

A RESOLUTION OF THE COUNCIL OF THE CITY OF MERCED ESTABLISHING A POLICY TO GUIDE THE INSTALLATION OF TRAFFIC CALMING

WHEREAS, City residents, land owners and business tenants periodically request that the Engineering Department shall be responsible for installation of traffic calming devices at specific locations to control vehicle traffic; and

WHEREAS, the Engineering Staff apply criteria ("warrants") used by the engineering profession to determine if traffic conditions warrant the installation of traffic calming devices at particular locations; and

WHEREAS, residents and owners of residential properties may desire the installation of traffic calming devices at locations where standard warrants are not met but where managing traffic continues to be a concern; and

WHEREAS, the installation of traffic calming and policies that guide their installation are exempt from the provisions of the California Environmental Quality Act (CEQA).

NOW THEREFORE BE IT RESOLVED by the Council of the City of Merced as follows:

Section 1: To adopt the following policy and direct the City Engineer to initiate immediate implementation:

The following policy will guide the Engineering Department in responding to citizen requests for the installation of traffic calming devices. This policy applies to the installation of traffic calming devices; it does not apply to the design of solutions to area-wide traffic problems.

1. *Installation of traffic calming devices in commercial areas should meet traffic warrants used by the City Engineer.*
2. *Installation of traffic calming devices in residential areas will be considered when traffic conditions meet warrants used by the City Engineer, or when:*
 - A. *The traffic calming device is on a street designated by the Circulation Element as a "local" street and is fronted by property zoned for "Low-" or "Medium-Density" Residential; and*
 - B. *The residents requesting the installation petitions households within the study area of the proposed device location and submits petition results to the Engineering Department; and*
 - C. *The City Engineer determines that the petition results show that at least 67% of the households within the study area or as determined by the Traffic Committee of the proposed device support its installation; and*

Page 2 – RESOLUTION NO. 07-___ (2007 Series)

D. The City Engineer finds that the cumulative impact of installing multiple traffic calming devices along a local street:

(1) Will not limit options for managing traffic in Neighborhood Traffic Calming Areas designated by the Circulation Element; and

(2) Will not divert traffic to other local streets in the area or cause traffic standards set by the Circulation Element to be exceeded.

3. When traffic conditions meet warrants, the applicant and/or the neighborhood will cover the cost of installing the stop sign. When traffic conditions do not meet warrants, the requesting resident(s) shall be allowed to resubmit an application for the same location after a period of 24-months or 2-years to the date of denial. Once installed, the City will be responsible for ongoing maintenance.

On motion of _____, seconded by _____ and on the following roll call vote:

AYES:

NOES: None

ABSENT: None

the foregoing resolution was adopted on this ___ day of _____.

ATTEST

City Clerk

APPROVED

APPENDIX I: Graphic Materials and Information About Various NTC Devices

Police Enforcement

Description:

Police officers are dispatched to target street(s) within the Traffic Calming Impact Area to enforce speed regulations.

Cost: \$75 per hour



Advantages:

- Drivers more alert to their surroundings
- Targets specific streets and times of day
- Reduces speeds while officers present
- Can be used on any type of street
- Can be implemented on short notice
- No detrimental effects on traffic

Disadvantages:

- Requires ongoing use of officers to maintain a reduction in traffic speeds
-

Additional Details:

- Long term deployment of officers can be dependent on funding and officer availability
- Beneficial in school zones and other areas with a frequent presence of children

Speed Reduction	Yes
Safety Increase	Yes
Volume Reduction	Possible
Air Pollution	No Change
Noise Increase	None
Access Restrictions	No
Parking Loss	None
Emergency Access	No Change
Maintenance	No Change
Mass Transit	Impacted

Police Decoys

Description:

Police vehicles are placed in specific locations along problem street(s) in order to give the illusion of a police presence

Cost: \$75 per day



Advantages:

- Increases driver awareness
- Can be deployed on short notice to targeted areas
- Reduces speeds in target area

Disadvantages:

- Effectiveness decreased with use
- Not for long term use
- Pickup and drop-off of police vehicles may be impractical or impossible for police department

Additional Details:

- Long term implementation causes motorists to disregard presence of police and police vehicles
- Beneficial in school zones and other areas with a frequent presence of children
- Vehicles should only be parked on problem streets.

Speed Reduction	Temporary
Safety Increase	Yes
Volume Reduction	Possible
Air Pollution	No Change
Noise Increase	None
Access Restrictions	None
Parking Loss	No
Emergency Access	No Change
Maintenance	None
Mass Transit	No Impact

Speed Display Trailer

Description:

Speed radar Trailer that displays the current speed of drivers approaching the trailer.

Cost: \$4,000-\$10,000 (New Trailer)



Advantages:

- Effective speed reduction when trailer is deployed
- Shot notice deployment
- Illusion of police presence
- Causes drivers to be alert to their actual speed and reduce them accordingly

Disadvantages:

- Not self enforcing
- Trailer must be moved daily
- Drivers may ignore the trailer

Additional Details:

- Some motorists use the trailer as a challenge to see how fast they can go.
- Generally for use on streets with one lane of traffic flow in each direction

Speed Reduction	Yes
Safety Increase	Yes
Volume Reduction	No
Air Pollution	None
Noise Increase	None
Access Restrictions	None
Parking Loss	None
Emergency Access	No Change
Maintenance	Minimal
Mass Transit	No Impact

Permanent Speed Display Signs

Description:

A permanent display sign that displays the speeds of passing motorists.

Cost: \$10,000-\$15,000

Advantages:

- Illusion of police presence
- Causes drivers to be alert to their actual speed and reduce them accordingly
- No need for deployment as with speed trailer.

Additional Details:

- Some motorists use the trailer as a challenge to see how fast they can go.
- Generally for use on streets with one lane of traffic flow in each direction
- Can be solar powered (pictured) to reduce costs and



Disadvantages:

- Not self enforcing
- Adds signage to neighborhood

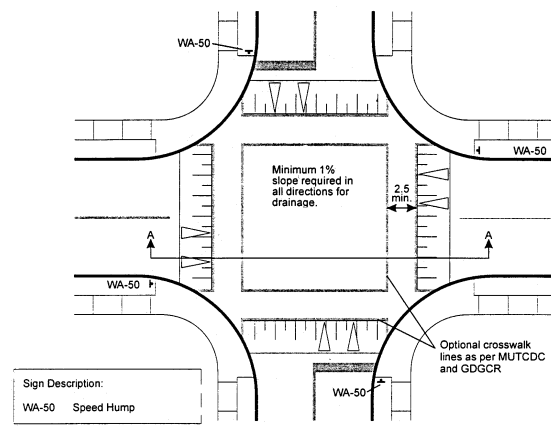
Speed Reduction	None
Safety Increase	Yes
Volume Reduction	Yes
Air Pollution	Decrease
Noise Increase	No
Access Restrictions	Yes
Parking Loss	Yes
Emergency Access	Decreased
Maintenance	Increase
Mass Transit	Impacted

Raised Intersection (raised junctions, intersection humps, plateaus)

Raised intersections are flat raised areas covering an entire intersection, with ramps on all approaches and often with brick or other textured materials on the flat section. They usually rise to the level of the sidewalk, or slightly below to provide a "lip" that is detectable by the visually impaired. By modifying the level of the intersection, the crosswalks are more readily perceived by motorists to be "pedestrian territory". Raised intersections are good for intersections with substantial pedestrian activity, and areas where other traffic calming measures would be unacceptable because they take away scarce parking spaces.

Design/Installation Issues:

- Typically rise to sidewalk level
- May require bollards to define edge of roadway
- Canadian installations typically have gentle 1:40 slopes on ramps
- Storm drainage modifications are necessary



Advantages:

- Raised Intersections improve safety for both pedestrians and vehicles
- If designed well, they can have positive aesthetic value
- They can calm two streets at once

Disadvantages:

- They tend to be expensive, varying by materials used
- Their impact to drainage needs to be considered

Effectiveness:

- Average of 1% decrease in the 85th percentile travel speeds, or from an average of 34.6 to 34.3 miles per hour; (from a sample of 3 sites).

Potential Impacts:

- Reduction in through movement speeds at intersection
- Reduction in mid-block speeds typically less than 10 percent
- No effect on access
- Make entire intersections more pedestrian-friendly
- No data available on volume or safety impacts

Emergency Response Issues:

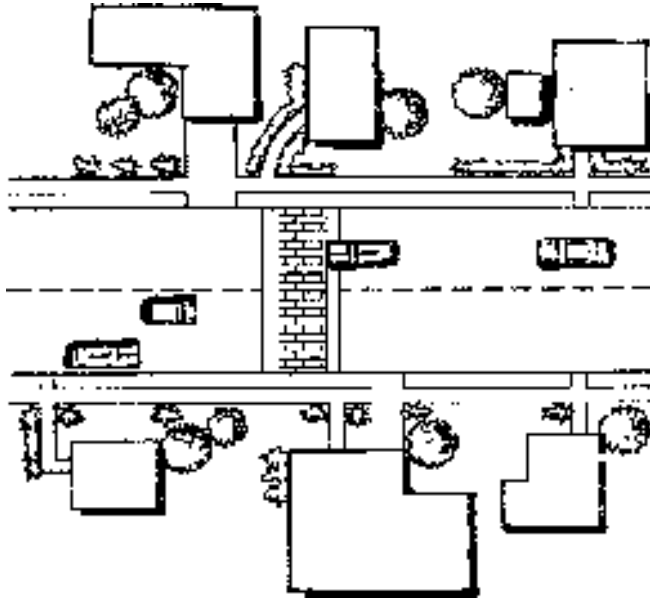
- Slows emergency vehicles to approximately 15 miles per hour

Cost Estimate(s):

Reported costs range between \$15,000 and \$70,000 (2007 dollars)

Speed Tables (Trapezoidal humps, speed platforms)

Speed tables are flat-topped speed humps often constructed with brick or other textured materials on the flat section. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat section. Their long flat fields give speed tables higher design speeds than Speed Cushions. The brick or other textured materials improve the appearance of speed tables, draw attention to them, and may enhance safety and speed-reduction.



Design/Installation Issues:

- Typically 22 feet in the direction of travel with 6 foot ramps on each end and a 10 foot flat section in the middle; other lengths (32 and 48 feet) reported in U.S. practice
- Most common height is between 3 and 4 inches (and reported as high as 6 inches)
- Ramps are typically 6 feet long (reported up to 10 feet long) and are either parabolic or linear
- Careful design is needed for drainage

Advantages:

- They are smoother on large vehicles (such as fire trucks)
- They are effective in reducing speeds
- Speed tables are good for locations where low speeds are desired

Disadvantages:

- They have questionable aesthetics, if no textured materials are used;
- Textured materials, if used, can be expensive; and
- They may increase noise and air pollution.

Effectiveness:

- For a 22-foot speed table:
 - Average of 18% decrease in the 85th percentile travel speeds, or from an average of 36.7 to 30.1 miles per hour; (from a sample of 58 sites).
 - Average of 45% decrease in accidents, or from an average of 6.7 to 3.7 accidents per year (from a sample of 8 sites).

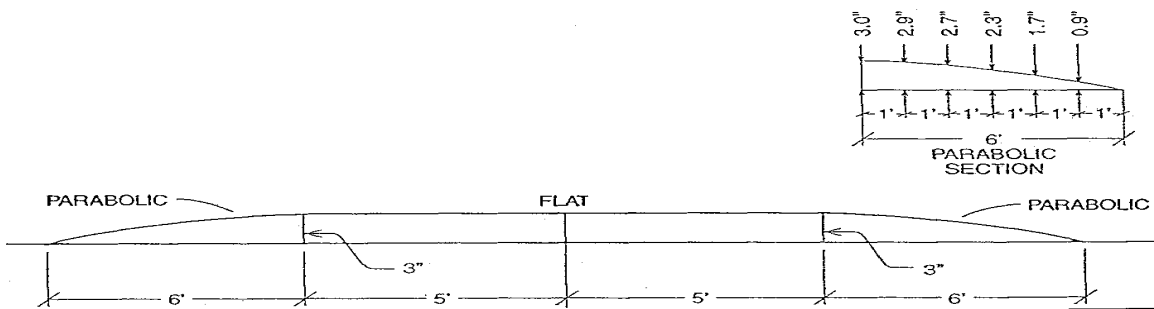
Speed Tables (Trapezoidal humps, speed platforms) (cont'd)

Potential Impacts:

- No effect on access
- Speeds are reduced, but usually to a higher crossing speed than at speed humps (typically between 25 and 27 miles per hour)
- Traffic volumes have been reduced on average by 12 percent depending on alternative routes available
- Collisions have been reduced on average by 45 percent on treated streets (not adjusted for traffic diversion)
- Reported to increase pedestrian visibility and likelihood that driver yields to pedestrian

Emergency Response Issues:

- Typically preferred by fire departments over 12 to 14-foot speed humps
- Generally less than 3 seconds of delay per hump for fire trucks

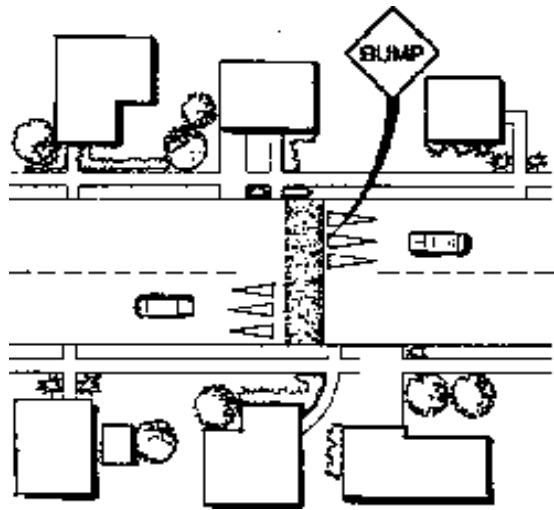


Typical Cost:

Approximately \$3,500 (in 2007 dollars) for asphalt tables; higher for brickwork, stamped asphalt, concrete ramps and other enhancements sometimes used at pedestrian crossings.

Speed Cushions (Road Humps, Undulations)

Speed cushions are rounded raised areas placed across the roadway. They are generally 10 to 14 feet long (in the direction of travel), making them distinct from the shorter "speed bumps" found in many parking lots, and are 3 to 4 inches high. The profile of a speed cushions can be circular, parabolic, or sinusoidal. They are often tapered as they reach the curb on each end to allow unimpeded drainage.



Speed Cushions are good for locations where very low speeds are desired and reasonable, and noise and fumes are not a major concern.

Advantages:

- Speed Cushions are relatively inexpensive
- They are relatively easy for bicycles to cross if designed appropriately
- They are very effective in slowing travel speeds.

Disadvantages:

- They force large vehicles, such as emergency vehicles and those with rigid suspensions, to travel at slower speeds
- They may increase noise and air pollution
- They have questionable aesthetics.

Effectiveness:

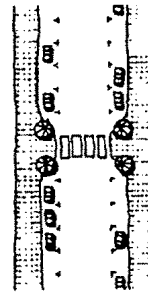
- For a 12-foot cushion:
 - Average of 22% decrease in the 85th percentile travel speeds, or from an average of 35.0 to 27.4 miles per hour; (from a sample of 179 sites).
 - Average of 11% decrease in accidents, or from an average of 2.7 to 2.4 accidents per year (from a sample of 49 sites).
- For a 14-foot cushion:
 - Average of 23% decrease in the 85th percentile travel speeds, or from an average of 33.3 to 25.6 miles per hour (from a sample of 15 sites).
 - Average of 41% decrease in accidents, or from an average of 4.4 to 2.6 accidents per year (from a sample of 5 sites).

Cost Estimate(s): Reported costs range between \$2,750 - \$3,500 (2007 dollars)

Raised Crosswalks ... (raised crossings, sidewalk extensions)

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

Raised crosswalks are good for locations where pedestrian crossings occur at haphazard locations and vehicle speeds are excessive.



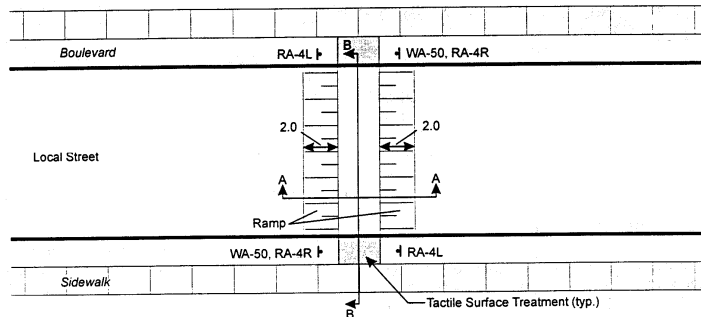
MID-BLOCK FLARE

Advantages:

- Raised Crosswalks improve safety for both pedestrians and vehicles
- If designed well, they can have positive aesthetic value
- They are effective in reducing speeds, though not to the extent of Speed Humps

Disadvantages:

- Textured materials, if used, can be expensive
- Their impacts on drainage needs to be considered
- They may increase noise and air pollution



Effectiveness:

- For a 22-foot Speed Table (the most similar device for which data is available):
 - Average of 18% decrease in the 85th percentile travel speeds, or from an average of 36.7 to 30.1 miles per hour; (from a sample of 58 sites).
 - Average of 45% decrease in accidents, or from an average of 6.7 to 3.7 accidents per year (from a sample of 8 sites).

Similar Measures:

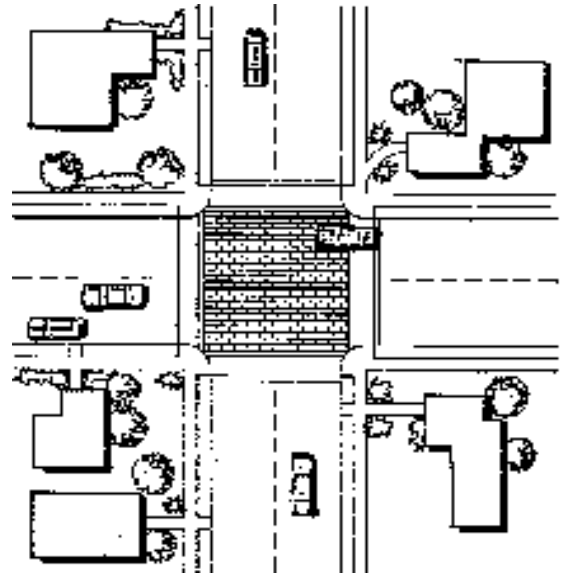
- By removing the crosswalk markings and signage, you have a Speed Table
- By removing the crosswalk and the flat section in the middle, you have a Speed Hump
- By raising the level of an entire intersection, you have a Raised Intersection

Cost Estimate(s): Approximately \$4,250 (2007 Dollars)

Textured Pavements... (cobblestone, brick pavement, stamped pavement)

Textured and colored pavement includes the use of stamped pavement or alternate paving materials to create an uneven surface for vehicles to traverse. They may be used to emphasize either an entire intersection or a pedestrian crossing, and are sometimes used along entire street blocks.

Textured pavements are good for "main street" areas where there is substantial pedestrian activity and noise is not a major concern.



Advantages:

- Textured Pavements can reduce vehicle speeds over an extended length
- If designed well, they can have positive aesthetic value
- Placed at an intersection, they can calm two streets at once

Disadvantages:

- They are generally expensive, varying by materials used
- If used on a crosswalk, special care should be used for wheelchair users and the visually impaired

Effectiveness:

- No data has been compiled on the effects of textured pavements

Similar Measures:

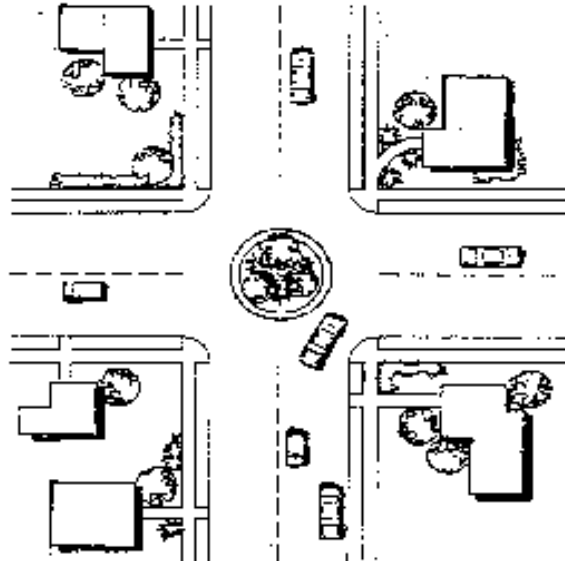
- Textured pavements are often combined with Speed Tables, Raised Crosswalk, and Raised Intersections
- Textured pavements are occasionally combined with Speed Humps

Cost Estimate(s):

- Varies by materials used and the amount of area covered

Traffic Circles... (rotaries, intersection islands)

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are good for calming intersections, especially within neighborhoods, where large vehicle traffic is not a major concern but speeds, volumes, and safety are problems.



Advantages:

- Traffic Circles are very effective in moderating speeds and improving safety
- If designed well, they can have positive aesthetic value
- Placed at an intersection, they can calm two streets at once

Disadvantages:

- They are difficult for large vehicles (such as fire trucks) to circumnavigate
- They must be designed so that the circulating lane does not encroach on the crosswalks
- They may require the elimination of some on-street parking
- Landscaping must be maintained, either by the residents or by the municipality

Effectiveness:

- Average of 11% decrease in the 85th percentile travel speeds, or from an average of 34.1 to 30.2 miles per hour (from a sample of 45 sites)
- Including a large sample from Seattle, an average of 73% decrease in accidents, or from an average of 2.2 to 0.6 accidents per year (from a sample of 130 sites)
- Excluding the large sample from Seattle, an average of 29% decrease in accidents, or from an average of 5.9 to 4.2 accidents per year (from a sample of 17 sites)

Similar Measures:

- By placing a raised island in a midblock location, you have a Center Island Narrowing
- By enlarging the intersection and the center island, inserting splitter islands at each approach, setting back the crosswalks away from the circulating lane, and implementing yield control at all approaches, you have a Roundabout

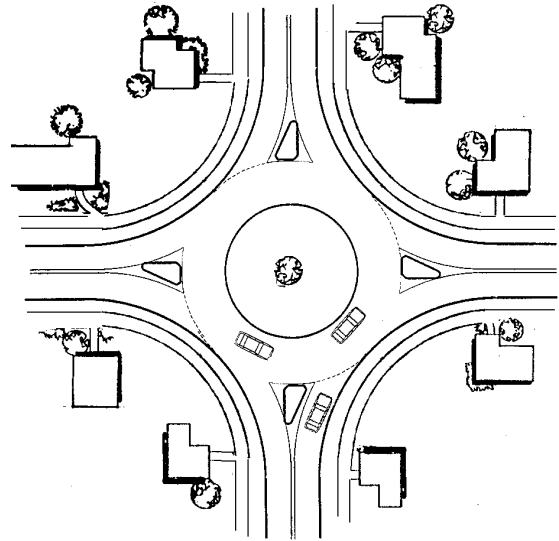
Cost Estimate(s):

- Varies by materials used and the amount of area covered

Roundabouts... (rotaries)

Good for:

- Locations with a history of accidents;
- Intersections where queues need to be minimized
- Intersections with irregular approach geometry
- Providing inexpensive-to-operate traffic control as an alternative to a traffic signal
- Handling a high proportion of U-turns
- Locations with abundant right-of-way



Advantages:

- Roundabouts can moderate traffic speeds on an arterial
- They are generally aesthetically pleasing if well landscaped
- They enhanced safety compared to traffic signals
- They can minimize queuing at the approaches to the intersection
- They are less expensive to operate than traffic signals

Disadvantages:

- They may be difficult for large vehicles (such as fire trucks) to circumnavigate
- They must be designed so that the circulating lane does not encroach on the crosswalks
- They may require the elimination of some on-street parking
- Landscaping must be maintained, either by the residents or by the municipality

Effectiveness:

- Average 29% reduction in accidents, with a reduction from 9.3 to 5.9 accidents per year (from a sample of 11 sites; source: *Roundabouts: An Informational Guide*).

Similar Measures:

- By constructing a small island in a neighborhood intersection and leaving the existing curbs, you have a Traffic Circle

Cost Estimate(s):

- Varies by materials used and the amount of area covered

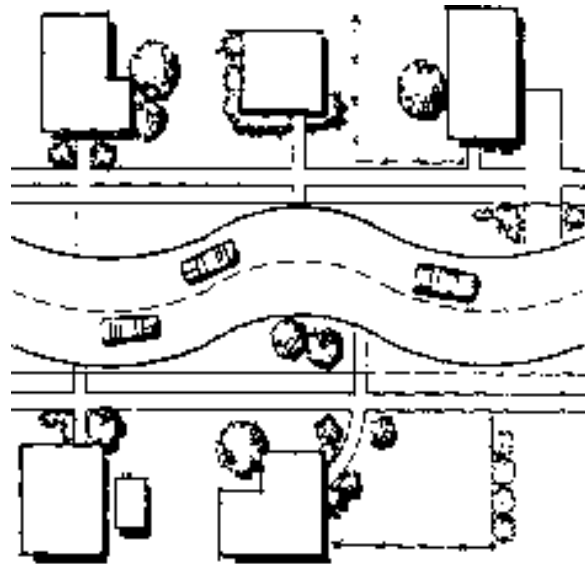
Chicanes... (deviations, serpentines, reversing curves, twists)

Chicanes are curb extensions that alternate from one side of the street to the other, forming S-shaped curves. Chicanes can also be created by alternating on-street parking, either diagonal or parallel, between one side of the street and the other. Each parking bay can be created either by restriping the roadway or by installing raised, landscaping islands at the ends of each parking bay.

Good for locations where speeds are a problem but noise associated with Speed Humps and related measures would be unacceptable.

Advantages:

- Chicanes discourage high speeds by forcing horizontal deflection
- They are easily negotiable by large vehicles (such as fire trucks) except under heavy traffic conditions



Disadvantages:

- They must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be costly, especially if there are drainage issues
- They may require the elimination of some on-street parking

Effectiveness:

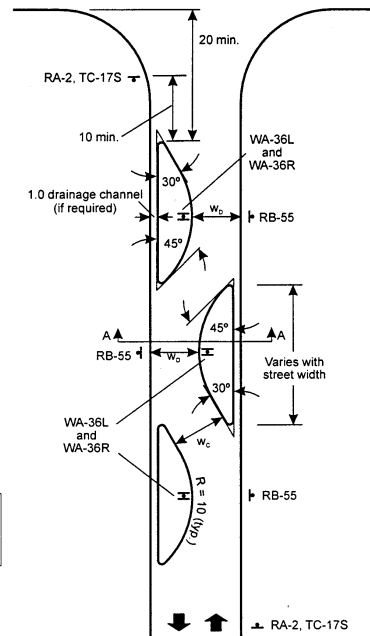
- No data has been compiled on the effects of chicanes

Similar Measures:

- By placing the edge islands opposite each other (without staggering them), you have a Choker

Cost Estimate(s):

- \$20,000 (2007 Dollars)



	Two Lanes	One Lane
w _c	7.0	4.5
w _c	6.0 min.	3.5 min.

Realigned Intersections... (modified intersections)

Realigned intersections are changes in alignment that convert T-intersections with straight approaches into curving streets that meet at right-angles. A former "straight-through" movement along the top of the T becomes a turning movement. While not commonly used, they are one of the few traffic calming measures for T-intersections, because the straight top of the T makes deflection difficult to achieve, as needed for Traffic Circles. They are good for T-intersections.



Advantages:

- Realigned Intersections can be effective reducing speeds and improving safety at a T-intersection that is commonly ignored by motorists

Disadvantages:

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

Effectiveness:

- No data has been compiled on the effects of realigned intersections

Similar Measures:

- A T-intersection can also be calmed using a Traffic Circle, but special provisions are needed to ensure that there is horizontal deflection along the top of the T. Either:
 - The curb along the top of the T must be widened to accommodate the circulating lane
 - An approach deflection island must be constructed for vehicles approaching along the top of the T
 -
- If vertical measures are acceptable, then a T-intersection can be calmed using a Raised Intersection

Cost Estimate(s):

- Varies by curve radii and size of right-of-way acquisition, if required

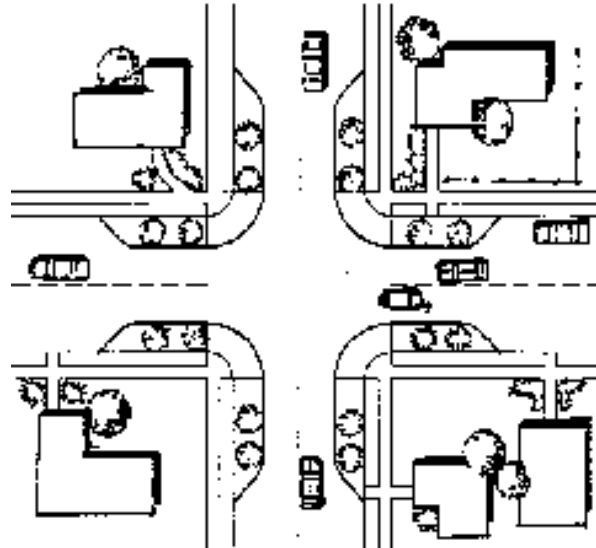
Neckdowns... (nubs, bulbouts, knuckles, intersection narrowings, corner buldges, safe crosses)

Neckdowns are curb extensions at intersections that reduce the roadway width from curb to curb. They "pedestrianize" intersections by shortening crossing distances for pedestrians and drawing attention to pedestrians via raised peninsulas. They also tighten the curb radii at the corners, reducing the speeds of turning vehicles.

They are good for intersections with substantial pedestrian activity and areas where vertical traffic calming measures would be unacceptable because of noise considerations.

Advantages:

- Neckdowns improves pedestrian circulation and space
- Through and left-turn movements are easily negotiable by large vehicles
- They create protected on-street parking bays
- They reduce speeds, especially for right-turning vehicles



Disadvantages:

- Effectiveness is limited by the absence of vertical or horizontal deflection
- They may slow right-turning emergency vehicles
- They may require the elimination of some on-street parking near the intersection
- They may require bicyclists to briefly merge with vehicular traffic

Effectiveness:

- Average of 7% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites)

Similar Measures:

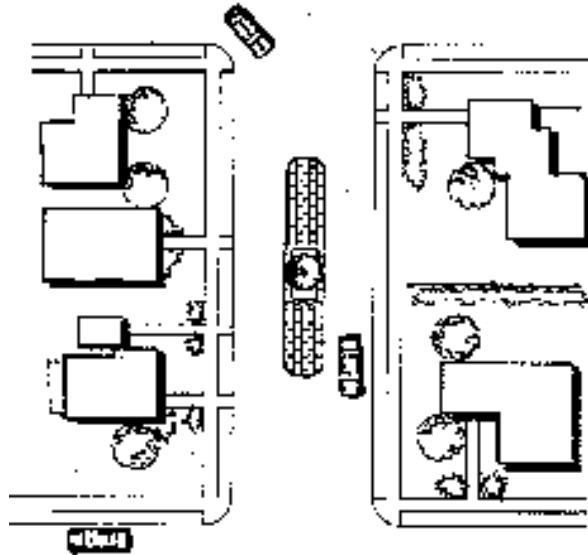
- If a roadway is narrowed at a midblock location, you have a Choker
- Can be easily combined with a Raised Intersection

Cost Estimate(s): \$55,000 - \$110,000 for four corners (in 2007 dollars)

Center Island Narrowings... (midblock medians, median slowpoints, median chockers)

A center island narrowing is a raised island located along the centerline of a street that narrow the travel lanes at that location. Center island narrowings are often landscaped to provide a visual amenity. Placed at the entrance to a neighborhood, and often combined with textured pavement, they are often called "gateway islands." Fitted with a gap to allow pedestrians to walk through at a crosswalk, they are often called "pedestrian refuges."

Center Island Narrowings are good for entrances to residential areas, and wide streets where pedestrians need to cross.



Advantages:

- Center Island Narrowings increase pedestrian safety
- If designed well, they can have positive aesthetic value
- They reduce traffic volumes

Disadvantages:

- Their speed-reduction effect is somewhat limited by the absence of any vertical or horizontal deflection
- They may require elimination of some on-street parking

Effectiveness:

- Average of 7% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites)

Similar Measures:

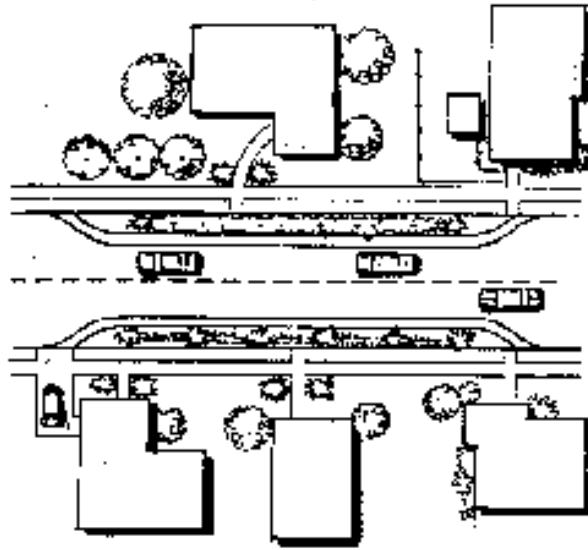
- If a roadway is narrowed out from the curbs at an intersection, you have a Neckdown

Cost Estimate(s):

- \$6,500 – 20,500 (in 2007 dollars)

Chokers... (pinch points, midblock narrowings, midblock yieldpoints, constrictions)

Chokers are curb extensions at midblock locations that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also known as safe crosses. Two-lane chokers leave the street cross section with two lanes that are narrower than the normal cross section. One-lane chokers narrow the width to allow travel in only one direction at a time, operating similarly to one-lane bridges.



They are good for areas with substantial speed problems and no on-street parking shortage.

Advantages:

- Chokers are easily negotiable by large vehicles (such as fire trucks)
- If designed well, they can have positive aesthetic value
- They reduce both speeds and volumes

Disadvantages:

- Their effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- They may require bicyclists to briefly merge with vehicular traffic
- They may require the elimination of some on-street parking

Effectiveness:

- Average of 7% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites)

Similar Measures:

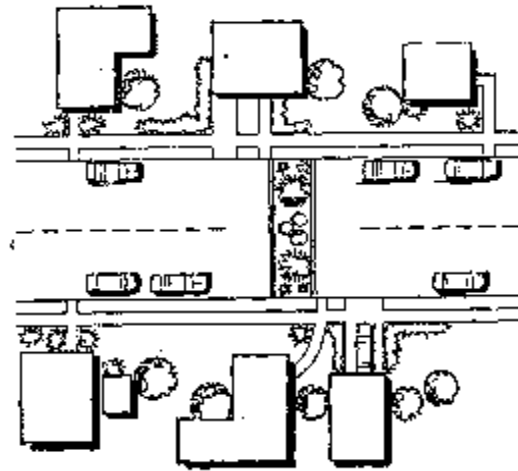
- If a roadway is narrowed at an intersection, you have a Neckdown
- If a roadway is narrowed from the centerline, rather than from the curbs (i.e. using a raised island), you have a Center Island Narrowing

Cost Estimate(s):

- \$10,000 - 14,000 (in 2007 dollars)

Full Closures... (cul-de-sacs, dead ends)

Full street closures are barriers placed across a street to completely close the street to through-traffic, usually leaving only sidewalks open. They are good for locations with extreme traffic volume problems and several other measures have been unsuccessful.



Advantages:

- Full Closures are able to maintain pedestrian and bicycle access
- They are very effective in reducing traffic volume

Disadvantages:

- They require legal procedures for street closures (in California - varies by state)
- They cause circuitous routes for local residents and emergency services
- They may be expensive
- They may limit access to businesses

Effectiveness:

- Average of 44% decrease in traffic volume, or a decrease of 671 vehicles per day (from a sample of 19 sites)



Similar Measures:

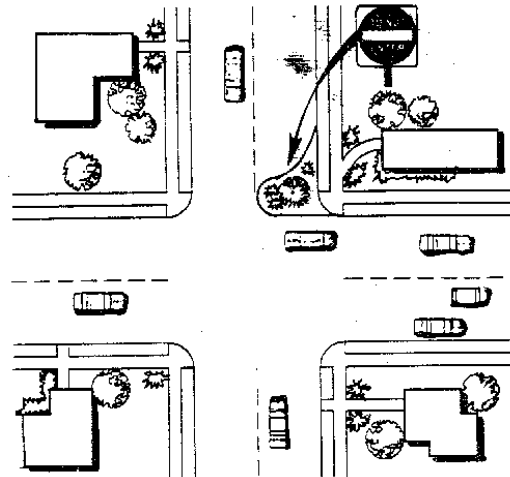
- By opening the street only for incoming traffic, you have a Half Closure
- By placing a barrier lengthwise along the center of a street past a side street, you have a Median Barrier
- By placing the barrier diagonally through an intersection, you have a Diagonal Diverter

Cost Estimate(s):

- \$165,000 (in 2007 dollars)

Half Closures... (partial closures, one-way closures)

Half closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. They are good for locations with extreme traffic volume problems and non-restrictive measures have been unsuccessful.



Advantages:

- Half Closures are able to maintain two-way bicycle access
- They are effective in reducing traffic volumes

Disadvantages:

- They causes circuitous routes for local residents and emergency services
- They may limit access to businesses
- Depending on the design, drivers may be able to circumvent the barrier

Effectiveness:

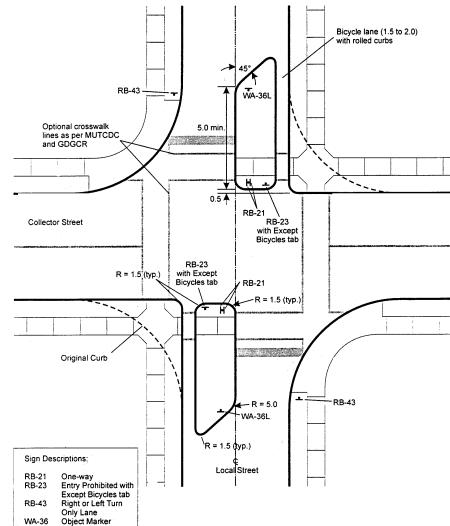
- Average of 42% decrease in traffic volume, or a decrease of 1,611 vehicles per day (from a sample of 53 sites)

Similar Measures:

- By closing the street in both directions, you have a Full Closure
- By placing a barrier lengthwise along the center of a street past a side street, you have a Median Barrier
- By placing the barrier diagonally through an intersection, you have a Diagonal Diverter

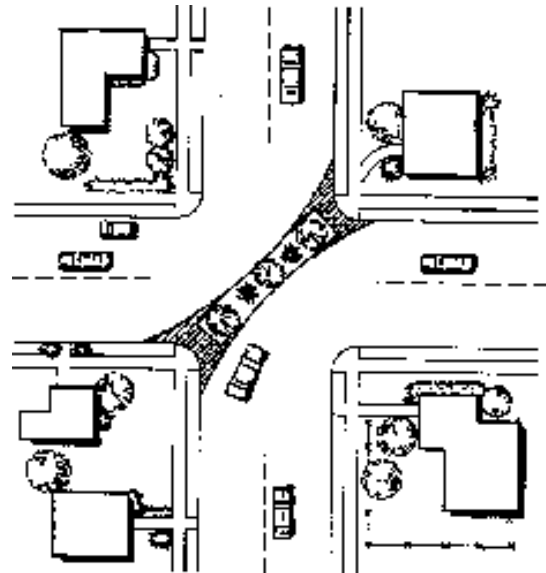
Cost Estimate(s):

- \$55,000 (in 2007 dollars)



Diagonal Diverters... (full diverters, diagonal road closures)

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movements and creating two separate, L-shaped streets. Like half closures, diagonal diverters are often staggered to create circuitous routes through the neighborhood as a whole, discouraging non-local traffic while maintaining access for local residents. They are good for inner-neighborhood locations with non-local traffic volume problems.



Advantages:

- Diagonal Diverters do not require a closure per se, only a redirection of existing streets
- They are able to maintain full pedestrian and bicycle access
- They reduce traffic volumes

Disadvantages:

- They cause circuitous routes for local residents and emergency services
- They may be expensive
- They may require reconstruction of corner curbs

Effectiveness:

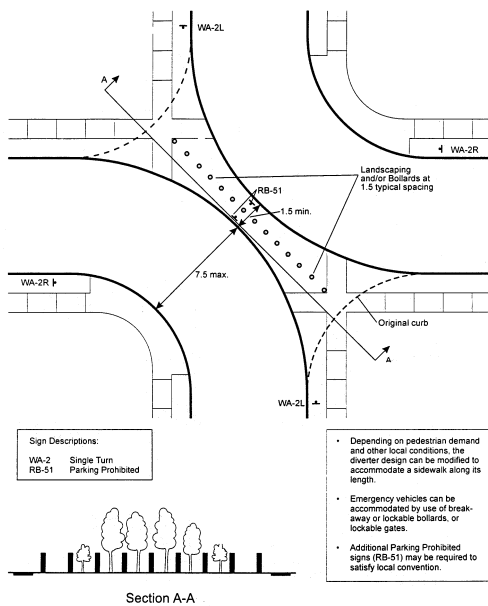
- Average of 35% decrease in traffic volume, or a decrease of 501 vehicles per day (from a sample of 27 sites)

Similar Measures:

- By placing a barrier across a street along only one stem of the intersection, you have a Full Closure
- By placing a barrier only half-way across a street along only one stem of the intersection, you have a Half Closure
- By placing the barrier length-wise along the roadway centerline across a side street, you have a Median Barrier

Cost Estimate(s):

- \$115,000 (in 2007 dollars)

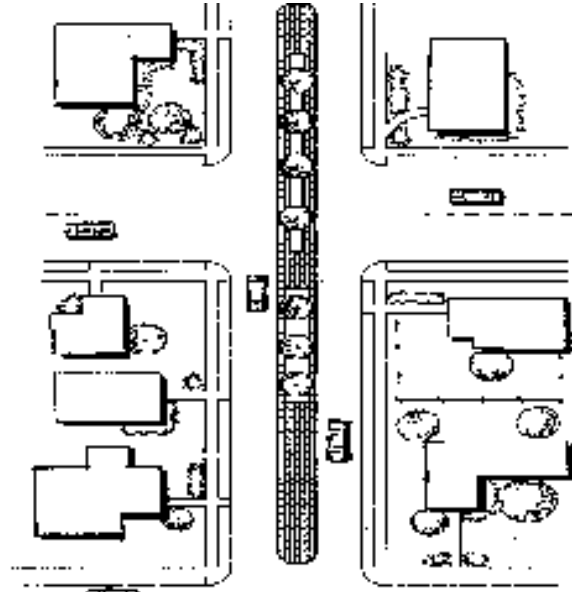


Median Barriers... (median diverters, island diverters)

Median barriers are islands located along the centerline of a street and continuing through an intersection so as to block through movement at a cross street.

They are good for:

- Local street connections to main streets where through traffic along the continuing local street is a problem
- Main streets where left-turns to and/or from the side street are unsafe



Advantages:

- Median Barriers can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- They can reduce traffic volumes on a cut-through route that crosses a major street

Disadvantages:

- They require available street width on the major street
- They limit turns to and from the side street for local residents and emergency services

Effectiveness:

- Average of 31% decrease in traffic volume, or a decrease of 1167 vehicles per day (from a sample of 10 sites; average includes various types of volume control measures)

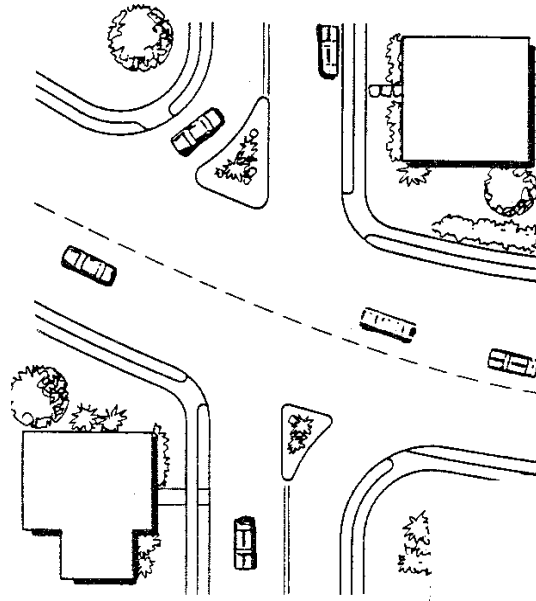
Similar Measures:

- By placing a barrier across only one stem of the intersection, you have a Full Closure
- By placing a barrier only half-way across a street along only one stem of the intersection, you have a Half Closure
- By placing the barrier diagonally through an intersection, you have a Diagonal Diverter
- By shortening the barrier and placing it at a midblock location only, you have a Center Island Median
- By restricting turning movements using channelization out of the side street itself, you have a Forced Turn Island

Cost Estimate(s): \$20,000 - 28,000 per 100 feet (in 2007 dollars)

Forced Turn Islands... (forced turn channelizations, pork chops, right turn islands)

Forced Turn Islands are raised islands that block certain movements on approaches to an intersection. They are good for local street connections to main streets where through traffic volume along the continuing local street is a problem, and main streets where left-turns or through movements out of the side street are unsafe.



Advantages:

- Forced Turn Islands can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- They reduce traffic volumes

Disadvantages:

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

Effectiveness:

- Average of 31% decrease in traffic volume, or a decrease of 1167 vehicles per day (from a sample of 10 sites; average includes various types of volume control measures)

Similar Measures:

- By placing a barrier across only one stem of the intersection, you have a Full Closure
- By placing a barrier only half-way across a street along only one stem of the intersection, you have a Half Closure
- By placing the barrier diagonally through an intersection, you have a Diagonal Diverter
- By restricting turning movements using an island on the main street, you have a Median Barrier

Cost Estimate(s):

- \$4,000 - 7,000 (in 2007 dollars)

APPENDIX J: Environmental Review

NOTICE OF EXEMPTION

Appendix I

To: _____ Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

From: City of Merced
678 West 18th St.
Merced, CA 95340

County Clerk
County of Merced



Project Title: Neighborhood Traffic Calming Guidelines

Project Location: City-wide policy on traffic calming

Project Location - City: Merced

Project Location - County: Merced

Description of Project: Provide guidelines to citizens of Merced on how to apply for Traffic Calming measures

Name of Public Agency Approving Project: City of Merced

Name of Person Carrying Out Project: John Ainsworth

Exempt Status: (check one)

- Ministerial (Sec. 21080(b)(1); 15268)
- Declared Emergency (Sec. 21080(b)(3); 15269(a))
- Emergency Project (Sec. 21080(b)(4); 15269(b)(c))
- Categorical Exemption: Class & Section Number: Class 1, Section 15301(c)
- Statutory Exemptions

Reasons why Project is Exempt: In accordance with the above referenced Section 15301, operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures ... involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. (c) Existing highways and streets, sidewalks, gutters, bicycle and pedestrian trails, and similar facilities (this includes road grading for the purpose of public safety).

Lead Agency: City of Merced

Contact Person: David L. Tucker, City Engineer **Area Code/Telephone:** (209) 385-6846

Signature: David L. Tucker

Date: 12-3-07

Signed by Lead Agency