

CITY OF PALO ALTO NEIGHBORHOOD TRAFFIC CALMING PROGRAM

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**CITY OF PALO ALTO
NEIGHBORHOOD TRAFFIC CALMING PROGRAM
for Local and Collector Streets**

I. INTRODUCTION

The City receives numerous requests, complaints, and suggestions from residents about traffic issues—pertaining to maintenance, stop signs, visibility impairment, parking, traffic signal timing, lane striping, speeding, traffic volumes, trucks, crashes, and other issues. City staff respond in several ways to these requests. For example, routine maintenance of streets, signing, signals and landscaping is handled by the Public Works and Utilities Departments. Violations of speed limits and other rules of the road are handled by the Police Department. Stop sign requests are evaluated by the Transportation Division and require City Council approval. Specific operational issues (for example, a parking problem or a traffic lane configuration problem) are routinely investigated by the Transportation Division. The Transportation Division also manages the Residential Arterial Traffic Calming Program, as discussed on the next page. The Transportation Division and the Police Department often address student safety and transportation issues by undertaking special school-related studies. The Transportation Division is also active in several organizations dealing with traffic concerns at the regional level.

Somewhat different than the above traffic issues are the concerns of some residents about chronic problems affecting local residential streets—speeding, commuter shortcutting, or just too much traffic—affecting areas ranging from a single block to an entire neighborhood. Addressing these problems poses a challenge because they are not easily addressed by the usual City actions described above. For example, the degree of speeding is often not severe or frequent enough to warrant taking Police Department time away from other problem areas. Commuter shortcutting is not a traffic violation that can be addressed by enforcement. Educational techniques that are provided by the Police Department or Transportation Division can help address these issues to some degree, but require continual effort. Often, the City has addressed such neighborhood traffic problems only when the issues were pervasive enough to affect an entire neighborhood. The result is a sometimes uncertain procedure or a neighborhood-wide traffic study that requires considerable City Council involvement. The Neighborhood Traffic Calming Program (NTCP) makes it easier for the City to respond efficiently and fairly to neighborhood traffic problems by (i) establishing a defined formal procedure for evaluating requests for “spot” treatments affecting one or a few streets without causing noticeable spillover traffic onto other residential streets; and (ii) providing a dedicated funding source for these “spot” treatments.

For purposes of this program, traffic calming is defined as the combination of physical, educational, and enforcement measures that reduce the negative effects of motor vehicle use, alter driver behavior, improve safety for non-motorized street users, and improve neighborhood livability. Physical measures include devices such as speed humps and traffic circles, and are discussed in more

detail in Chapter IV. The Neighborhood Traffic Calming Program unifies and formalizes existing City policies and programs relating to protection of neighborhood streets from impacts of vehicular traffic. The City Council has established an annual budget of \$100,000 (subject to periodic renewal) in order to fund the design and installation of simple traffic calming measures under this program. Some expensive projects, such as multiple fully landscaped circles and islands, will require a separate funding allocation from the City Council. Projects involving an entire neighborhood will not be prioritized or acted upon as part of this program. They will require special approval and funding from the City Council before they can be undertaken. The Transportation Division manages the overall program, including design, construction, and appropriate educational activities. The Police Department provides enforcement and, where appropriate, safety and educational outreach. The Public Works Operations Division is responsible for maintenance. Figure 1 illustrates how the traffic calming program fits in with the other ways the City addresses traffic issues.

The traffic calming program described here is only for residential local and collector streets. Figure 2 shows which streets are local, collector and arterial streets. Local and collector streets must be predominantly residential in character in order to qualify for the traffic calming program (i.e., having at least 50 percent of street frontage in single or multiple family uses). Traffic issues related to arterial streets are quite different from those of local and collector streets, as the purpose of arterial streets is to carry larger volumes of through traffic in a relatively free-flowing manner. In fact, many of the problems that residents experience on local and collector streets result from congested traffic conditions on arterial streets. This Neighborhood Traffic Calming Program does not address arterial street issues, except that a traffic calming project might include traffic flow improvements on a nearby arterial street that are designed to attract shortcutting traffic out of a neighborhood and back onto an arterial. Indeed, reducing traffic problems on local and collector streets depends partly on maintaining free-flowing arterial traffic. Changes to arterial streets that impede free traffic flow make traffic calming on nearby local and collector streets more challenging.

Recognizing the interest in, and need for, traffic calming on arterial streets that are residential in nature, the City has already embarked on a multi-year project that will implement physical changes to residential arterial roadways. The primary goal of the Residential Arterial Traffic Calming Program is to reduce speeds on residential arterial streets while maintaining full arterial traffic volumes and full access for all vehicles and other road users. This is a distinct program from the Neighborhood Traffic Calming Program described here and is being implemented on a separate track.

The City intends to apply the guidelines and procedures of the Neighborhood Traffic Calming Program in a flexible manner. This program should be viewed as a "living document" that will be modified frequently as the City gains experience with the various aspects of the program, such as the minimum qualifying criteria, ranking system, and/or procedures. Every effort has been made to streamline this program, while still including the important elements of citizen participation and involvement of the Planning and Transportation Commission and City Council in the most important decisions.

Figure 1

Figure 2

II. OBJECTIVES

The following objectives have been established for the Neighborhood Traffic Calming Program.

1. Improve pedestrian and bicycle safety and neighborhood livability by reducing traffic speeds, crashes, and cut-through traffic on local and collector streets, by means of engineering, education, and enforcement measures.
2. Establish a defined formal procedure to implement traffic calming measures in an efficient, fair, and timely manner in response to residents concerns.
3. Provide an annual budget for “spot treatment” traffic calming projects (i.e. projects of one or a few streets, with no noticeable traffic shift onto other residential streets).
4. Focus Planning and Transportation Commission and City Council involvement on the major decisions required to implement traffic calming projects.

III. GUIDELINES

The following guidelines are observed in the Neighborhood Traffic Calming Program.

1. Traffic not generated by or related to a specific neighborhood should be encouraged to use arterial streets.
2. A low ambient level of non-neighborhood traffic on local streets usually exists and is virtually unavoidable (estimated at approximately 10-20 percent of total daily volume).
3. Preservation of emergency vehicle access will be maintained in traffic calming projects.
4. Reasonable automobile access to traffic-calmed streets should be maintained. Pedestrian, bicycle, and transit access should be encouraged and enhanced wherever possible. The policy of the Comprehensive Plan is to keep all neighborhood streets open unless there is a demonstrated safety or overwhelming through traffic problem and there are no acceptable alternatives, or unless a closure would increase the use of alternative transportation modes.
5. Lanes may need to be narrowed at specific locations in order to accomplish traffic calming, thus lessening the shared space available for bicyclists and drivers. The resulting vehicle speeds and volumes will determine the extent to which bicyclists feel negatively affected. Any localized impacts on bicyclists must be balanced with the overall benefit to bicyclists and neighborhood residents of lower vehicle speeds and/or lower traffic volumes attained through traffic calming.
6. Removal of parking spaces may be necessary in order to provide sufficient room to install some traffic calming measures. Parking removal authorized by City staff will not exceed 60 feet on each side of a local street, within every 400-foot length of street (excluding intersecting public or private streets or alleys). Parking loss at specific locations must be balanced with a neighborhood's desire to realize the benefits of the traffic calming measures.
7. The traffic calming program is limited to local and collector streets that are primarily residential in nature. As defined in the Comprehensive Plan, local streets are designed to provide access to adjacent properties only, while collector streets perform not only that function, but also distribute traffic within an area to and from arterials. This program does not apply to non-residential streets nor to any arterial streets (refer to Figure 2).

8. Traffic calming measures on a local street will be designed to minimize the diversion of traffic to another adjacent local street. However, some diversion may be unavoidable. An increase of up to 25 percent of existing volume on an adjacent local street is considered to be acceptable on most streets, as volume changes up to that magnitude are not perceived by most residents. One exception is that the resulting total traffic volume on an adjacent local street (existing volume plus the added volume diverted from the traffic-calmed street) should not exceed 2500 vpd.¹
9. Traffic calming measures on a collector street will be designed to address primarily speed. As noted above, collector streets are designed to serve some level of neighborhood-related through traffic to/from arterials. In some cases, diversion of traffic from a local to a collector street may be appropriate, depending in each specific case on the nature and amount of the diverted traffic, up to an increase of 25 percent of existing volume.
10. In the hierarchy of city streets, arterials are the designated and desirable carriers of through traffic and, as such, will often receive non-neighborhood through traffic diverted from local and collector streets by neighborhood traffic calming measures.
11. Traffic calming projects to be undertaken in this program may range from a single block to multiple streets, but not an entire neighborhood. Neighborhood traffic calming studies and any unusually expensive or complex traffic calming projects will be conducted and funded separately after specific authorization of the Planning and Transportation Commission or City Council.
12. The procedures established for this program will ensure that requests for traffic calming are treated fairly, in that they must meet certain minimum criteria to be considered for study and will be prioritized according to stated criteria. Exceptions to the normal prioritizing procedure would usually be considered only as a consequence of (a) unanticipated impacts of new development or redevelopment; (b) unanticipated impacts of changes in the City's street network; (c) unanticipated impacts of other traffic calming projects in the City; or (d) appearance of unusual safety problems on a street or in a neighborhood. In one or more of these instances, Transportation staff may forward a revised list of rankings to the Planning and Transportation Commission for review and to the City Council for approval.

¹ The 25 percent increase is based on the Traffic Infusion on Residential Environments (TIRE) index which shows that, up to that point, most residents do not perceive the increase in volume. The TIRE index is a method of describing and measuring residents' perceptions of the effect of street traffic on residential activities such as walking, cycling, playing, interacting with neighbors, and backing a car in and out of a driveway. The index was developed by neighborhood traffic management researchers in the United States and England, and serves as a reference tool for judging the anticipated effect of changes in traffic volumes. The City has employed this index in prior neighborhood studies, in evaluating traffic impacts of land development projects, and in the Environmental Impact Report for the Comprehensive Plan.

13. The number of traffic calming projects may exceed the available level of funds and staff. This may result in delays of from one to three years for consideration of some requests, or the inability to address these requests.
14. If a trial traffic calming plan results in traffic diversion to adjacent streets that exceeds the allowable 25 percent threshold, causes unacceptable delays to emergency services, or has other unintended results as determined by City staff, the trial will be terminated, even if residents are in favor of the plan.

IV. PHYSICAL TRAFFIC CALMING MEASURES

Typical physical traffic calming measures are listed below and illustrated and described in the Appendix. They are listed generally in order of increasing effectiveness in reducing traffic volumes and/or speeds.

- Warning and Specialty Signs
- Stop Signs [technically not a traffic calming device but may be used in traffic calming plans]
- Speed Limit Signs
- Gateways
- Textured Crosswalks
- Special Striping, Narrow Lanes
- On-Street Parking
- Bulbouts, Chokers, Curb Extensions
- Median Island Slow Points
- Raised Intersections**
- Traffic Circles
- Serpentine Streets, Chicanes*
- Speed Tables and Raised Crosswalks**
- Speed Humps*
- Slow Streets*
- Turn Prohibition Signs
- Diagonal Diverters, Forced Turn Channelization, Median Barriers*
- One-Way (Half) Street Closure*
- Full Street Closure*

*Not permitted on collector streets unless an exception is granted by the Fire Department and/or the Transportation Division. All speed hump projects will be reviewed by the Fire Department before approval is given.

**Permitted on collector streets at intersections after Fire Department review. Speed tables and raised crosswalks may be permitted on collector streets midblock if Fire Department approves the specific location (s).

These measures can be used individually or in combination. Not all of them may be feasible or acceptable in all locations. For example, street closures, though very effective at reducing non-neighborhood traffic, are usually very controversial, disrupt the traditional neighborhood street grid, can limit emergency vehicle access, and may shift too much traffic to adjacent local streets. Comprehensive Plan Policy T-33 discourages street closures except for certain situations, such as an overwhelming through traffic problem with no alternative measures available, and/or if closures would increase the use of alternative transportation modes. Traffic calming options are much more limited on collector streets, as collectors are the designated carriers of neighborhood traffic to and from arterials, as well as part of the Fire Department's primary emergency response network. Speed humps, while very effective at reducing speeds without prohibiting access, have a substantial negative impact on fire and paramedic services. Therefore, they cannot be used on collector streets

unless the Fire Department and the Transportation Division grant an exception. More discussion on the limitations imposed on the use of traffic calming measures is contained in the next chapter of this program.

Some measures, such as bulbouts and medians, could be installed inexpensively with painted striping or raised pavement markers instead of constructing raised islands. This is not recommended, because experience has shown that drivers often drive over painted stripes and markers, thus reducing the effectiveness of the device. Similarly, the use of signs is not as effective as actual physical devices on the pavement, because drivers may ignore the signs and regular police enforcement is usually required. Traffic calming can also be accomplished to some degree by the presence of on-street parking, which narrows the traveled way. Another effective, but expensive, engineering method of reducing speed is the complete re-engineering of an entire street corridor in order to create a narrower cross-section, and/or to "close in" the street environment with extensive landscaping, on-street parking, or other infrastructure.

The detailed procedures and minimum qualifying criteria by which residents can obtain traffic calming measures are described in Chapters VI and VII later in this document.

V. PROS AND CONS OF TRAFFIC CALMING

Traffic calming projects have successfully reduced speeds and volumes in a variety of situations. Most cities, including Palo Alto, have numerous physical traffic calming measures already employed, and more are constantly being installed. Physical traffic calming programs are popular among residents—resulting in a high demand for projects. Generally, the benefits of traffic calming are obvious and predictable, while the disadvantages may not be quite so obvious. If not implemented correctly, traffic calming measures could result in problems more significant than the original concern. The following discussion is provided to help residents be fully informed before requesting action and to help residents understand the issues that the City must consider in implementing a traffic calming project.

The Benefits of Traffic Calming Measures. Speeding is one of the primary complaints that the City receives about traffic conditions on local streets. The most effective speed control measures are those that force drivers into vertical or horizontal movement. These are speed humps, speed tables, raised crosswalks and intersections, traffic circles, median slow points, and serpentine streets. These measures generally reduce vehicle speeds to 15 mph at the device, and to 25 - 30 mph along a corridor of multiple devices, depending on their spacing. Reduced speeds result in lower noise levels, reduced severity of crashes, and an improved neighborhood environment for bicycling, walking and residential activities. Non-neighborhood traffic can be reduced by approximately 10 - 20 percent by a series of speed reduction measures, and can be dramatically reduced (up to 100 percent) by street closures and diverters. The benefits of reduced traffic volumes are similar to those of reduced speeds. Reducing the level of non-neighborhood traffic may also reduce littering and crime. Many measures provide opportunities for landscaping in formerly paved areas, thus contributing positively to neighborhood aesthetics. There is some evidence that a well-designed traffic calming project can increase neighborhood property values.

One of the most important impacts of traffic calming is the potential reduction in the severity and number of crashes on traffic-calmed streets. Safety is enhanced through increased driver awareness of other street users and reductions in volumes, speeds and conflicts. In the United States, reduction of crashes due to installation of traffic calming measures has been reported to be an overall average of 50 percent. Traffic circles appear to offer the greatest reduction in collisions. Speed reduction is especially important for pedestrian safety, as the severity of injury to a pedestrian when hit by an automobile is dramatically reduced by lowering of vehicle speeds from 35 mph (usually fatal) to fewer than 20 mph (usually just minor injuries). The value of such safety enhancements can partially offset the negative impacts of some traffic calming measures on emergency vehicle access.

Delays to Emergency Response Vehicles. Some traffic calming measures can cause substantial delay to fire and paramedic vehicles and ambulances. These vehicles are particularly susceptible to the vertical displacement of speed humps because of the weight and length of fire trucks, and the delicate instruments and patients in paramedic vans and ambulances. Creating bumps, dips and curves is precisely the result being sought in many traffic calming measures. While these maneuvers will cause moderate discomfort and delay for normal passenger vehicles, including those used by the Police Department, they cause a much greater problem for fire and paramedic vehicles. These vehicles must come to almost a complete stop before passing over a speed hump. Measures that

create horizontal displacement, such as traffic circles, serpentine streets, or median slow points, also delay emergency vehicles, but less than humps. Traffic calming measures that are placed at intersections, such as traffic circles, raised crosswalks, and raised intersections, are less of a problem for emergency services, because drivers of emergency vehicles must slow down at intersections anyway. Delays caused by traffic calming measures must be considered by emergency service providers as they strive to meet the adopted mission goals of response times of four minutes or less for 90 percent of fire and basic medical calls, and six minutes or less for 90 percent of advanced medical (paramedic) calls. For example, each speed hump creates a delay of up to ten seconds for a ladder truck and up to five seconds for an ambulance. Speed humps are usually installed in sets of two to three humps per block, so potential delay can accrue quickly in a multi-block speed hump project.

For the purpose of this traffic calming program, the Fire Department has designated the City's network of expressways and arterial and collector streets as the primary fire response network (illustrated in Figure 2). The Fire Department may also designate certain local streets as routine emergency routes, especially if they are in the immediate vicinity of a fire station. Because collector streets are eligible for this traffic calming program, yet are part of the emergency response network, traffic calming measures for collector streets must be specifically designed to have minimal impact on emergency vehicle access times. The traffic calming measures designated with an asterisk (*) in Chapter IV usually cannot be used on collector streets, in part, because of emergency vehicle response impacts. The Fire Department emphasizes that *all* City streets, including local streets, should be available for possible response routes in emergencies. On the other hand, the Fire Department understands that a reasonable number of traffic calming measures should be permitted on local streets due to residents' concerns about impacts of automobile traffic on their neighborhoods. It should be expected, however, that the Fire Department would resist most speed hump projects, and instead advocate for other types of traffic calming measures. *All* requests for speed humps, whether on local or collector streets, will be reviewed by the Fire Department before approval is given. Due to impacts on emergency services, speed hump installations will be limited to a maximum of 50 percent of the traffic calming capital budget for each fiscal year.

Traffic calming measures will typically reduce the severity of automobile crashes, thus reducing the number of calls for service in the traffic-calmed area, but the Fire Department also responds to fires, medical emergencies, and domestic accidents that, collectively, represent the majority of calls on local neighborhood streets. In the final analysis, there must be a balance between the speed of emergency vehicle response versus the neighborhood quality of life improvements that result from traffic calming. The City and residents must keep this balance in mind in considering the implementation of traffic calming measures.

Solving the Problem or Shifting the Problem? A traffic calming project must be carefully designed and monitored to minimize shifting traffic from one neighborhood street to another. The drivers most likely to change routes are those who are not residents of the street on which the traffic calming measures are installed. Any traffic calming device that effectively reduces speeds can be expected to divert some portion of traffic to other routes (10 - 20 percent for a series of speed humps and traffic circles), even though the street remains open. This is because, for most drivers, time is the primary factor in route choice. A 50 - 90 percent reduction in traffic volume can be obtained with full and partial street closures, with that level of traffic moving to other streets and corridors. This high level of diverted traffic is difficult to control and can be a problem if it moves to adjacent local neighborhood streets.

Ideally, drivers diverted by traffic calming measures should move to a nearby arterial route if it is not too overcrowded. Other drivers who are closer to their origins or destinations might properly shift to neighborhood collector streets. Sometimes drivers shift to other routes that are in entirely different corridors from the original route. Unfortunately, not all diverted drivers will shift to a "proper" route and may end up on another local residential street. The City endeavors to design traffic calming installations that minimize this "shifting of the problem" to other local streets. A good traffic calming design will minimize the volume of diverted traffic, and/or control to which streets the diverted traffic moves. This traffic calming program is based on a permissible shift of traffic that amounts to an increase of up to 25 percent of the volume on the street to which the shift occurs. This increase is based on traffic research which shows that, up to that point, most residents do not perceive the increase in volume (refer to Guideline 8). Traffic calming measures are effective in reducing speeds in the immediate vicinity of the measures. In order to reduce speeds along a corridor, an effective traffic calming project will usually require a series of measures. Drivers may "make up" lost time by speeding up between widely spaced measures or after a series of measures.

Everyone Is Inconvenienced. Enforcement and education efforts aimed at controlling speeds or influencing driver behavior impact primarily the irresponsible drivers—usually a relatively small percentage of the driving population. On the other hand, physical traffic calming measures create delay and inconvenience for *all* drivers using the particular street.

Impacts on Parking and Other Road Users. Bicyclists, pedestrians and any other road users can encounter problems with physical traffic calming measures. All measures are designed to be acceptably safe for all users, assuming that these users are attentive as they proceed down the street. Speed humps and traffic circles, for example, are two of the most popular traffic calming measures. Bicyclists can traverse speed humps at typical cycling speeds without slowing down. However, if a bicyclist is careless (e.g., riding with no hands, not watching the road, no lights at night, etc.), the cyclist might unexpectedly encounter a hump and be caught off balance. Where lanes are narrowed, bicyclists and drivers usually must share the lane, possibly becoming a problem if traffic volumes are moderate to high. Traffic circles force drivers to the right at intersections, toward (but not into) the crosswalks, and pedestrians sometimes feel that their safety is being compromised. Residents

who are used to parking in front of their homes on the street may also be impacted, as some measures require prohibition of on-street parking. These disadvantages for various user groups need to be considered along with the recognized benefits of overall traffic speed and volume reduction that results from a traffic calming project.

Visual Concerns. While some traffic calming measures can be visually pleasing by introducing landscaping into formerly paved areas, others can be unsightly. Since these measures are intended to pose obstacles to drivers, they must be well signed, striped and reflectorized in order to avoid safety problems and limit potential liability exposure for the City. For example, a traffic circle offers the visual benefit of providing a large new area of landscaping in a former expanse of asphalt. However, this visual benefit is partially offset by the addition of several new poles with highly visible reflective signs. Speed humps offer only increased visual clutter, with highly visible traffic signing, reflective markers and signs. Negative visual impacts are multiplied when a street with a series of measures is viewed from one end of the traffic-calmed area. This visual consideration should be part of residents' decision-making process in requesting traffic calming measures.

Costs. Most well-designed traffic calming measures are expensive. Administration of the traffic calming program and the design, installation, maintenance and enforcement of traffic calming measures create recurring costs to the City. The annual cost of the "spot treatment" element of the Neighborhood Traffic Calming Program is \$100,000, not including administration, enforcement, maintenance, neighborhood studies, or unusually expensive traffic calming measures. Ultimately, all of these costs are borne by Palo Alto taxpayers.

The City has considered the general balance of the above pros and cons and, by its adoption of this traffic calming program, concludes that the benefits of traffic calming outweigh the disadvantages. This process must then be repeated by the City and residents for each specific traffic calming project. The purpose of the guidelines and criteria that govern this program is to insure, to the greatest degree possible, that traffic calming measures are used where there is a reasonably high probability that the benefits will outweigh the disadvantages.

VI. PROCEDURE FOR REQUESTING TRAFFIC CALMING MEASURES

When a request for traffic calming is received, the Transportation Division first determines whether the request could be handled through other simpler procedures described in the Introduction. For example, a problem of drivers speeding around a sharp curve might be solved simply by installing appropriate signs or striping at that specific location. *The City will make every effort to mitigate the identified problem(s) at this early stage without having to embark on an actual traffic calming project.*

Many steps in this procedure will not be necessary for simple traffic calming projects, such as speed humps. Once a traffic calming project has begun, the Transportation Division will determine which steps in the procedure would apply to that project and will guide residents accordingly. If the City determines that a project would be too large for the budget of this traffic calming program, or would/should include an entire neighborhood, the project will be considered as a "complex project" or "neighborhood project." Due to the usual high capital expense and staffing needs associated with such projects, this type of project will be placed on a separate project list to be forwarded annually to the City Council for separate funding and authorization to proceed. When such projects are started, they would usually be conducted following the same procedure as other traffic calming projects, as follows.

1. Receive request and determine eligibility and ranking.

A request for traffic calming on one or a few streets must include a petition signed by 25 percent of the households on each block where action is requested. A household is defined as any owned or rented living unit with its own street address, regardless of how many people live in the unit. Each household is represented by one signature, regardless of the number of people in the household. The street(s) for which traffic calming is requested must have at least 50 percent of the total street frontage developed in, or zoned for, single or multiple family land uses.

A traffic calming request may pertain to problems of speeding, through traffic, or crashes on local or collector streets. Upon receipt of a traffic calming request, the Transportation Division will collect the data required to determine if the minimum qualifying criteria described in Chapter VII have been met. Qualified requests will then be placed on the project list according to the ranking criteria in Chapter VII. If the minimum criteria are not met and, if the problem can be addressed through police enforcement, education, or other means, the City will take the best corrective action. Transportation staff will begin work on traffic calming projects according to the project's position in the project list and the staffing available. Other possible exceptions to the standard criteria are discussed in Chapter VII.

2. Determine project area and notify residents.

Once Transportation Division is ready to work on a traffic calming request, staff will first determine the "primary street" segment(s) where traffic calming measures might be placed. Primary street segments are usually bounded by collectors, arterials or other through streets. Transportation also determines whether any cross streets or adjacent parallel streets might be affected by traffic calming actions that might be taken on the primary street(s). This larger area, consisting of the primary streets, cross streets and/or adjacent parallel streets, is termed the "project area." A letter will then be sent to all households within the project area to notify residents that a project is beginning, to share the data gathered so far, and to ask if there are other traffic issues that should be addressed. Transportation staff can add any new primary streets or segments to the project, based on the feedback obtained from this outreach.

3. Hold first project area meeting.

Residents of the project area will be notified of the first project area meeting, the purpose of which is to introduce the project and identify any other traffic issues that should be addressed. The impacts of various traffic calming measures on the provision of emergency services will be specifically discussed. Volunteers will be solicited to form a working group that will meet separately to begin development of one or more traffic calming plans to address issues on the primary streets. If the traffic calming project is simple (e.g., involves only one street), Transportation staff will develop one or more traffic calming plans for presentation at this first meeting. For such simple cases, agreement on a traffic calming plan might be reached at this meeting. Any potential plan involving the use of vertical traffic calming measures (speed humps, speed tables, raised crosswalks, raised intersections) will take into consideration the needs of any person living in the project area who has a disability as defined in the Americans with Disabilities Act (ADA).²

4. Gather additional data and hold working group meetings.

Additional data, possibly including a license plate survey to determine the extent of non-neighborhood through traffic, may need to be gathered at this point, depending on what other issues were raised in the responses to the initial project area letter. One or more working group meetings are convened to refine the Transportation Division's original plans and/or

² A situation could arise in which a person with a disability protected by the ADA would be denied ingress or egress to the person's place of residence because of the impact of driving over such a device. That person should be able to reasonably demonstrate that the proposed measure would aggravate the protected disability. In that situation, any traffic calming plan under consideration that included any of the above vertical measures would need to be modified to provide an unobstructed route of ingress and egress to the person's residence.

develop ideas for new plans. The working group will continue to meet until agreement is reached on a preferred plan and one or more alternates.

5. Mail plans to residents and hold second project area meeting.

The preferred plan and alternate(s), including projected traffic data developed by Transportation staff, will be mailed to project area residents along with a meeting announcement. Residents will be asked to mail comments back to the City and/or attend the meeting. The plans will be presented to residents at the meeting. Transportation staff will attempt to include any modifications desired by residents. It is desirable for project area residents to reach consensus on the preferred plan by this point.

6. Conduct survey to determine if a trial should be implemented.

The Transportation Division will prepare a survey for residents that describes the traffic calming measures proposed to be placed on the primary street(s) and asks if they would support undertaking a four-month trial (six months for complex projects). How the survey is conducted, will be determined by the type of traffic calming project. Because some traffic calming projects will not fit neatly into the following categories, Transportation staff might need to vary the survey procedure to best fit special cases.

- (i) For spot treatment local street projects that do not include street closures, diverters, or other measures that might substantially divert traffic to other streets, only those households located on the primary street(s) will participate in the survey. If measures are proposed for intersections (e.g., traffic circles), households on the intersecting street (up to one block in either direction) will also be surveyed. One response is allowed per household, regardless of the number of people in the household. Non-resident property owners and households on other project area streets will not participate in the survey at this time. In order for a trial to be considered for approval, a simple majority (50+ percent) of all households on the primary street(s) (i.e., not just of survey responses) must indicate support for the trial. If alternative plans are included in the survey, the total support for all plans must be a simple majority, and the alternative with the most support will be considered for a trial. Based on the survey results, the City Manager will decide if a trial can proceed. The Transportation Division will prepare a study of potential project impacts. Neither Planning and Transportation Commission nor City Council approval for a trial is required for these projects, so the procedure skips to Step 8.
- (ii) For collector street projects, complex projects, and projects including street closures or diverters, all project area households will be eligible to participate in the survey (i.e., residents of the primary street(s) plus any adjacent street(s) affected by traffic

diversion). One response is allowed per household. Non-resident property owners will not participate in the survey at this time. A simple majority (50+ percent) of *survey responses* must indicate support for the trial. If alternative plans are included in the survey, the total support for all plans must be a simple majority, and the alternative with the most support will be recommended to proceed to a trial. The recommendation of the Planning and Transportation Commission and the approval of the Director of Planning and Community Environment are required for the trial to proceed.

If the required resident support described above is not obtained, the procedure may either return to Step 4 (working group meeting) to select another alternative and repeat the above procedure, or the process would end at this point.

7. Planning and Transportation Commission review and Director of Planning and Community Environment approval to conduct a trial plan of collector street projects, complex projects, and projects including street closures or diverters.

The Transportation Division will prepare a report to the Planning and Transportation Commission to request its review of a trial of the traffic calming plan (including selection of the preferred alternative for the trial, if necessary). The entire project area will be notified of the meeting. The Commission will listen to public testimony and discuss the proposed trial. The recommendations of the Commission will then be forwarded to the Director of Planning and Community Environment for final approval. If the trial is not approved, the procedure may either return to Step 4 (working group meeting) to select another alternative and repeat the above procedure, or the process would end at this point.

8. Design, implement and conduct approved trial.

The detailed plan for the trial will be designed and bids solicited for construction. The design effort may need to be contracted out, in which case bids would also need to be solicited for the design work. Traffic data will be gathered before the trial is implemented, and at or near the end of the trial. The typical trial period will be four months for spot treatment projects and six months for complex projects.

9. Evaluate trial results and hold third project area meeting.

At or near the end of the trial, City staff will evaluate the results of the trial plan. Residents of the entire project area will be notified by mail of the trial results. An optional third project area meeting may be held, at which the results of the trial will be discussed. At any point during a trial or at the end, Transportation staff could determine that the trial was clearly having substantial unacceptable impacts and should be removed, as discussed in Chapter VIII.

10. Conduct survey of residents regarding results of trial.

Transportation staff will distribute a survey to determine if residents believe that the trial was successful and if the project should be considered for permanent installation. The survey area will include residents and property owners in the entire project area. In order for Transportation staff to consider recommending to the Planning and Transportation Commission that the project be approved for permanent installation, support must be indicated by a simple majority (50+ percent) of project area survey responses, *including* 50+ percent of all households on the primary street(s).

11. Planning and Transportation Commission and/or City Council review of results of trial plan and decision on permanent installation.

Transportation will prepare a report to the Planning and Transportation Commission on the outcome of the trial plan. If the trial was successful, Transportation staff will prepare an environmental review based on the results of the trial. Residents and property owners of the project area will be notified. If the minimum project area support described in Step 10 is not obtained, or if the plan was clearly not successful as described in Step 9, Transportation staff will recommend removal of the trial traffic calming plan. Trials on local streets that do not involve street closures or diverters can be recommended for permanent installation by the Planning and Transportation Commission, with final approval by the Director of Planning and Community Environment. Trials of all other projects will require review by both the Commission and City Council, with final approval resting with the City Council. In both cases, the Commission and/or Council will listen to public testimony, discuss the project, and recommend whether the trial plan should be removed, modified, or made permanent. If a decision is made not to approve a permanent installation of the traffic calming plan, the project would end at that point, unless the Commission or Council directed that the process return to Step 4 to select another alternative.

12. Design and implement permanent plan and conduct follow-up evaluation.

The permanent installation will be designed and bids solicited for construction. The design might also need to be contracted out, in which case bids would also need to be solicited for the design work. Meetings with residents may be needed for design of permanent measures. City Council approval will be required for consultant and construction contracts exceeding a certain amount. A follow-up evaluation of the effectiveness of the plan may be conducted up to three years after permanent installation. Congratulations! The project is now complete.

Time Line. Most spot treatment projects will require about ten months to reach approval for a trial installation (Steps 1 - 6). The remainder of the process—from design, implementation and evaluation of the trial through approval, design and installation of the final plan—will take approximately an additional 10 - 14 months, for a total elapsed time of 20 - 24 months. Projects consisting only of speed humps, with a staff-approved trial and no final design requirements, would require only about

18 months. Complex projects would take at least twice as long as the above time frame, due to the need to obtain City Council funding, and the much greater complexity of those projects.

The above time estimates assume that there are sufficient City funds and staffing to handle the project workload. If there were a high citizen demand for projects, a project might be on the initial project waiting list up to 24 months. If construction funds were insufficient in any given year, an additional wait of 12 - 24 months might occur (one or two funding cycles) for construction of trial and/or permanent traffic calming measures.

Resident Funding of Permanent Installation. If residents desired to speed up the final construction process, the City would consider full (not partial) resident or property owner funding of a traffic calming project. Project area or primary street residents and property owners will determine how to collect the money. Any number of residents and/or property owners can contribute (full funding could even be provided by just a single resident), and residents will be solely responsible for amassing the required amount before presenting it to the City. A deposit of 50 percent of the estimated project costs must be made to the City before the final design of the project can begin. Residents must deposit the remaining 50 percent of the estimated project costs with the City before construction begins. Resident funding will be received only for approved traffic calming projects, with the purpose being to speed up permanent construction. Resident funding will not be used to speed up the qualification and study process or to qualify otherwise unqualified projects.

VII. NEIGHBORHOOD TRAFFIC CALMING REQUEST MINIMUM QUALIFYING AND RANKING CRITERIA

Qualifying Criteria. Requests for traffic calming on residential local and collector streets may be made for one or more candidate streets. Local and collector streets are illustrated in Figure 2. Requests involving one or a few streets (i.e., for “spot treatment”) must include a petition signed by 25 percent of the households, as described in Step 1 of Chapter VI. The street(s) for which traffic calming is requested must have at least 50 percent of the total street frontage developed in, or zoned for, single or multiple family land uses. In order for a request for spot treatment traffic calming projects to be eligible for this program, at least two of the following five criteria must be satisfied:

1. Minimum 85th percentile speed of 32 mph for local streets, and 35 mph for collector streets;³
2. Minimum volume of 1,200 vehicles per day (vpd) for local streets and 4,000 vpd for collector streets;⁴
3. Location within 1,000 feet walking distance of a school, senior citizen facility, facility for the disabled, park, community center, or other site with significant pedestrian activity;
4. Evidence (survey or field evaluation) of significant cut-through (i.e., through or non-neighborhood) traffic;
5. Unusual accident history (as defined by six or more crashes, or one fatal crash, in the prior three consecutive years—crashes due to parking, vehicle equipment, drug/alcohol, and certain other causes clearly not solvable by traffic calming will usually not be counted.)

Ranking Criteria. Requests that meet the minimum qualifying criteria are placed on a project list according to the following ranking scheme. Due to funding and staffing concerns, the Transportation Division will place complex/neighborhood projects on a separate project list to be forwarded annually to the Planning and Transportation Commission and the City Council for special funding, staffing, and authorization to proceed.

✓ Speed at, or up to, 10% above, the minimum speed criterion—one street:	3.0 points
✓ Speed at, or up to, 10% above, the minimum speed criterion—two+ streets:	6.0 points
✓ Speed more than 10% above the minimum speed criterion—one street:	4.0 points
✓ Speed more than 10% above the minimum speed criterion—two+ streets:	8.0 points
✓ Volume at, or up to, 20% above, the minimum volume criterion—one street:	1.5 points
✓ Volume at, or up to, 20% above the minimum volume criterion—two+ streets:	3.0 points
✓ Volume more than 20% above the minimum volume criterion—one street:	2.0 points

³ Speed measurements will be multiplied by ± 5 percent to allow for measurement error and random daily variability. If any point in the resulting speed range meets or exceeds the above minimum, this criterion will be satisfied.

⁴ Volume measurements will be multiplied by ± 10 percent to allow for measurement error and random daily variability. If any point in the resulting volume range meets or exceeds the above minimum, this criterion will be satisfied.

- ✓ Volume more than 20% above the minimum volume criterion—two+ streets: 4.0 points
- ✓ Within 1000 feet walking distance of a school, senior citizen facility, facility for the disabled, park, community center, or other site with significant pedestrian activity—one site: 2.5 points
- ✓ Within 1,000 feet walking distance of a school, senior citizen facility, facility for the disabled, park, community center, or other site with significant pedestrian activity—two+ sites: 5.0 points
- ✓ Evidence of significant cut-through traffic—one street: 1.0 points
- ✓ Evidence of significant cut-through traffic—two+ streets: 2.0 points
- ✓ Request supported by more than 50 percent of households on problem street(s): 2.0 points

VIII. REMOVAL OF TRAFFIC CALMING MEASURES

Traffic calming measures may be subject to removal at the trial or permanent stages for various reasons, including conformity with the Americans with Disabilities Act (ADA), impacts on emergency services, safety problems, unacceptable traffic impacts, or by request of affected residents.

Conformity with ADA. Traffic calming measures that force vertical movements for drivers (speed humps, speed tables, raised crosswalks, and raised intersections) could have a harmful effect on persons with certain disabilities, under certain circumstances. A person with a disability protected by the ADA might move residence to a street where one of these measures has previously been installed or is in a trial stage, and where there is no route of ingress and egress for the new resident that does not require travel over one of these measures. If that person requests removal of one or more of these measures because that person reasonably demonstrates that the measure aggravates the protected disability, the request will be evaluated and granted by the Chief Transportation Official (CTO). As part of that decision, the CTO would determine if removal of the device would negatively impact the overall traffic calming plan. If a potential negative impact were expected, the CTO would direct that a monitoring program be conducted to determine the impact of the change. If a negative impact were found, the CTO would direct that a project be initiated, generally following the procedures in Chapter VI, to evaluate a modification of the traffic calming installation. The goal would be to reduce or eliminate the impact of the device removal.

Impacts on Emergency Services. During City consideration of any potential trial or permanent installation of traffic calming measures, the Fire Department will evaluate impacts on its mission with regard to delay in providing fire and paramedic services. The Fire Department is particularly concerned with speed humps and other vertical measures on local and collector streets. A traffic calming plan that is expected to create unacceptable delay for the Fire Department would not be implemented. If a trial traffic-calming plan were implemented and then found to introduce unacceptable delays in emergency response, the trial would be adjusted accordingly or even removed. After the traffic calming plan has been tested, evaluated, approved, and permanently installed, it is unlikely that the Fire Department would later find that the plan is causing unacceptable delay impacts. If, for that reason, the Fire Department requests modification or removal of a permanent traffic calming plan, Transportation staff will take the request to the Planning and Transportation Commission and City Council for a recommendation or decision, whether or not the original installation was approved by those bodies. If modification of the plan were directed, Transportation staff would follow the same procedure in Chapter VI under which the plan had been originally installed.

Unacceptable Impacts. At any time during a trial period or at the end, if Transportation staff determines that the trial is clearly having substantial unacceptable impacts (e.g., traffic diversion

substantially exceeds the 25 percent threshold, substantial resident complaints, crashes, or substantial delays to emergency services), the procedure would return to Step 4 (working group meeting) to make modifications and repeat the trial. If it appeared that modifications could not be developed that would resolve the problem(s), the Chief Transportation Official would direct that a staff-approved trial be abandoned and the project would end at that point, even if residents were in favor of the trial. If commencement of the trial required review by the Planning and Transportation Commission, Transportation staff would prepare a report to the Commission recommending that the trial be abandoned. If problems were serious enough, Transportation staff could end the trial and remove the trial measures without notice, even if residents were in favor of the trial.

Residents' Request. Once a traffic calming plan has been developed, successfully tested in a trial installation (and changes made if necessary), and permanent measures designed and installed, it is unlikely that anyone would request removal of the installation. This has not occurred with any traffic calming projects in Palo Alto. However, there could be circumstances under which residents would desire such a removal. City staff would handle such a request on an ad-hoc basis, following the same procedure in Chapter VI under which the traffic calming plan had originally been installed. Usually, only residents from the project area, as defined in Step 2 of Chapter VI, would be eligible to make the request. The same percentage of project area households that is required to vote for installation of a plan would be required for its removal. A request for removal would be taken to the Planning and Transportation Commission and City Council for discussion and action, whether or not those bodies approved the original installation.