City of San Mateo

Neighborhood Traffic Management Program

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INTRODUCTION

DEFINING THE PROBLEM

Everyone would like to live on a quiet street where there is little traffic and all motorists drive slowly. Nevertheless, the fact is we all must share our streets with our neighbors and other people. Just as we need to drive by other people's houses on other streets on our way to work, school or shopping, other people need to use our street to get to work, school or shopping.

It is the City of San Mateo's policy to make residential streets as quiet and safe as possible. The measures identified in this document are intended to slow down traffic and discourage through traffic on residential streets, while keeping our neighborhoods accessible to police, fire, ambulance services, and the residents of San Mateo.

One of the most persistent and emotional concerns raised by residents of San Mateo is speeding on residential streets. Over past years, many requests have been received regarding excessive traffic speeds and/or volumes. In many respects, the physical makeup of the street determines traffic speeds. Wide streets encourage vehicles to speed where narrow streets tend to force drivers to drive more cautiously at lower speed. Long stretches of streets encourage higher speeds. Residents who live on streets with long straight, uninterrupted stretches of more than 1,000 feet consistently complain of excessive speeding. In addition, a traffic volume of 1,000 vehicles per day is generally considered the threshold when residents begin to believe their street has an unacceptable level of traffic volumes and high traffic speeds.

This document presents a programmatic approach to addressing these issues and is ultimately aimed at making residential streets more livable by providing an educational opportunity which would allow neighborhoods to participate in identifying and implementing solutions to their traffic concern. The document also provides for

engineering solutions, in the form of traffic calming, as a supplement to the overall neighborhood traffic mitigation efforts.

No single answer for the problem of speeding vehicles on all residential streets exists. Therefore, many different traffic calming techniques have been developed. These techniques range from the traditional, such as radar display boards and selective police enforcement, to non-traditional such as street chokers and neighborhood traffic circles. A discussion of the major techniques is found within this document. However, other options may be considered.

A major component of introducing traffic calming techniques is a comprehensive citizen education/participation campaign. A citizen education/participation campaign encourages the neighborhood to help identify, and then take responsibility for the solution. Experience has shown that, except for rare cases of cut through traffic, a majority of the speeding violations in a residential area are from residents who live in the neighborhood itself.

Traffic calming techniques work best when incorporated into a "traffic calming" or "neighborhood traffic management program." Successful programs include the planning process, overall community participation and local authority support. Because residents are the main initiators of traffic calming requests, they need to be part of the process as much as possible. By developing a program early on that addresses neighborhood traffic safety concerns on an area wide basis, it encourages citizens to become actively involved in the improvement process. In this way, the City and the neighborhood can work together to create more livable neighborhoods.

NEIGHBORHOOD TRAFFIC MANAGEMENT

The City of San Mateo's Neighborhood Traffic Management Program (NTMP) encompasses an overall approach to neighborhood traffic impact mitigation through a balanced use of the three E's – Education, Enforcement and Engineering. A neighborhood traffic management approach will allow Public Works staff to place a greater emphasis on the education aspect of traffic management and permit staff to focus on alternative solutions to a neighborhood's traffic problem without immediately leaping to the installation of physical devices through traditional traffic calming practices.

GOALS OF THE NTMP

Neighborhood Livability: The primary goal of the NTMP is to improve neighborhood livability through a comprehensive process that provides neighbors with the resources to reduce speeding, reduce traffic volumes, and address other traffic related issues that concern them. The NTMP focuses on residential streets with the goal of allowing children and families to feel more secure in their own neighborhoods.

Citizen Participation and Education: This goal strives to provide an educational forum where residents can be actively involved in evaluating the advantages and disadvantages of traffic management efforts. Through the NTMP process, residents

can obtain an understanding of traffic calming and traffic safety techniques available in the program.

Implementation of the Goals and Policies of the General Plan: The NTMP also serves to implement some of the goals and policies of the City's current General Plan:

> **GOAL 1:** Design and regulate use of city streets according to their classification and intended function.
>
> **POLICIES:**
> **C 1.1: Minimize Traffic Diversion.** Discourage non-local and commercial traffic from using local and collector residential streets through land use restrictions and traffic control devices, where appropriate. Design existing arterial roadways to minimize the diversion of traffic onto local residential streets. It is intended that residential neighborhoods be protected from the impacts of traffic diversion onto local and collector streets from the more heavily traveled roadways. This can be accomplished by ensuring, where feasible, adequate capacity of arterials, regulating the direction of traffic flow, and/or through placement of cul-de-sacs, ovals or islands or some other delineation device to avoid convenient substitute routes.
>
> **C 1.2: Protect Local Streets.** Do not permit new medium and high density residential and commercial projects to have primary access on local streets in single-family districts, except where there are no feasible alternative routes. When warranted, construct traffic calming devices on local streets to minimize the negative effects of motor vehicle traffic. The General Plan ensures that arterials and collectors provide access to the higher intensity commercial and residential districts. It is intended that local streets in single-family districts be protected from the adverse impacts associated with traffic generated by either higher intensity development or changing travel patterns. Individual project design should minimize traffic impacts by considering the direction of access in the placement of driveways. In neighborhoods where the existing or future impacts of motor vehicle traffic are severe, traffic calming measures may be used.

BALANCING THE E'S: EDUCATION, ENFORCEMENT AND ENGINEERING

Education, enforcement and engineering – the "3 E's" – are commonly accepted elements needed for the successful implementation of a neighborhood traffic management program. The experience of other similar programs has shown that use of only one of these E's, without the other two, often generates a less than satisfactory result. This NTMP process takes an approach which incorporates all three elements.

- **Education:** Residents will be able to work with City staff through a variety of outlets to make informed decisions about neighborhood traffic concerns and ways to positively influence driver behavior. Educational aspects of the NTMP may include a neighborhood educational forum or other outreach opportunities.

An education route will allow City staff to work with specific groups to target specific concerns in a way that is currently not considered under the current traffic calming program. City staff can, as an example, attend a school meeting to discuss pedestrian crossing safety as an alternate to the development of a traffic control plan to slow down neighborhood speeders. This approach may be able to specifically address a concern without embarking on a costly and time consuming process.

- **Enforcement:** Some strategies can be put into effect through targeted police enforcement to increase community awareness of speeding problems. The police department is committed to utilizing its available resources to respond to areas experiencing traffic problems as identified by resident concerns and conditions observed by enforcement officers.

  A lack of staff resources and funding has limited the Police Department's ability to provide adequate neighborhood traffic enforcement, and the only option available to residents for the reduction in neighborhood speeding is the installation of traffic calming devices. Public Works and the Police Department are exploring options for creating a dedicated Neighborhood Traffic Officer position through traffic calming program funding resources.

- **Engineering:** As the engineering component of a Neighborhood Traffic Management Program, traffic calming strategies, involving physical features, can be developed using a combination of sound engineering principles and community input. The implementation of a physical device is subject to the review and approval of the Public Works Commission.

It is important for neighborhoods participating in the NTMP to recognize that traffic concerns stem from a variety of sources and that the most appropriate solution may not be an engineering one. Elements of the other "E's" such as education and enforcement are equally valuable and are viable traffic calming measures that can be implemented in a neighborhood.

THE THIRD "*E*" - TRAFFIC CALMING IN SAN MATEO

DEVELOPMENT OF THE CITY'S TRAFFIC CALMING PRACTICES

The City's Traffic Calming document was developed with input from various city departments and several governing bodies. These include: Police, Fire, Planning and, Engineering departments; the City Council, Planning Commission, Public Works Commission, and the San Mateo Bicycle and Pedestrian Advisory Committee. In addition, the City solicited input from members of the public by meeting with various neighborhood associations and hosting a citywide workshop to discuss the development of a traffic calming policy. In this way, the community had a part in shaping the final document to better meet the needs of their neighborhoods and the community. While opinions vary regarding how traffic calming should best be applied, this document represents the City's attempt to produce a fair policy for all of San Mateo's residents.

The City intends to apply these policies and procedures in a consistent manner, yet like all City policies, this document/policy will be a "living document" that continues to grow and change over time to best serve the residents of our City.

WHAT IS TRAFFIC CALMING?

Traffic calming began in Europe around 1970 and has grown from a non-traditional approach to a widely adopted method of reducing traffic problems on residential streets. The term "traffic calming" is defined differently throughout the United States. The Institute of Transportation Engineers, an international educational and scientific association of transportation professionals, defines traffic calming as follows:

> "Traffic calming is 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 (bicyclists, pedestrians, etc…)."

The purpose of traffic calming is to alter a driver's behavior, either by forcing a vehicle to slow or to use an alternative route, through the use of engineering solutions and the installation of physical devices.

WHAT ARE TRAFFIC CALMING MEASURES?

Neighborhood traffic calming measures attempt to enhance traffic and pedestrian safety and preserve neighborhood character and livability. Each device has its own characteristic effects on traffic flow. The primary effects produced by these controls fall into the broad categories of speed reduction, traffic volume reduction, increased driver awareness, and increased safety.

The success of traffic calming measures depends on their use in locations and situations for which they are most effective. When appropriately implemented, they tend to be effective and self-enforcing. When implemented inappropriately, they tend to be excessively violated unless aggressive enforcement efforts are made. The City's enforcement resources are always in high demand, and it cannot be assumed that there will be resources available to provide aggressive enforcement of new traffic controls.

LIVING DOCUMENT

The contents of this document include tools for use by citizens, Public Works staff, and other interested parties to help develop effective traffic mitigation plans that adequately accommodate motor vehicles, pedestrians, and bicyclists, while enhancing the neighborhood environment.

To be sure the most current industry-wide information and tools are available to the program users, this document shall be considered a "living document". It may be updated from time to time as new neighborhood traffic management and traffic calming techniques are developed and tested, and the City and neighborhoods continue to gain more experience with the program.

PURPOSES OF THIS DOCUMENT

The purposes of this document are to:

1. Provide education opportunities for the public regarding neighborhood traffic management issues and mitigation methods,
2. Develop criteria for the application of traffic calming devices,
3. Define a uniform process for handling neighborhood traffic concerns.

The remainder of this document is dedicated to the development of engineering solutions, in the form of traffic calming, to mitigate neighborhood traffic concerns. Though is may seem that this document is primarily dedicated to traffic calming solutions, residents should keep in mind that other alternatives should be sincerely considered before continuing on to the next chapter of this document.

2.
TRAFFIC CALMING

The City receives many requests, complaints, and suggestions from residents regarding neighborhood traffic issues. City staff typically addresses these concerns by improving lane markings, clarifying or adding signs, increasing police enforcement, etc. Often, these solutions can successfully abate the neighborhood's concern. In some cases, however, the traffic problems experienced in a neighborhood are more *chronic* (excessive speeding or short-cutting) and may require more permanent, engineered solutions. Generally, it is the City's philosophy that traffic calming measures be applied to keep non-neighborhood traffic off neighborhood streets. However, this traffic must be accommodated somewhere. In most cases, this means more traffic would be diverted to arterials and collectors because these are the streets designed to carry non-neighborhood traffic. Ultimately, the City must balance neighborhood traffic concerns (speeds and volume of traffic) with overall mobility (travel times and level of service).

All streets are eligible for some type of traffic calming measures. However, some measures are more appropriate on certain types of streets than on others. For instance, imagine residents on El Camino Real requesting speed humps to reduce traffic speeds in front of their residences. This measure would severely limit the capacity of the roadway, create significant traffic congestion, and increase the travel times for thousands of commuters everyday. This example may appear extreme, but it is useful in demonstrating that some traffic calming measures are not appropriate for some streets. For this reason, an important distinction must be made between streets eligible for certain devices and those not eligible.

To this end, the City of San Mateo has established two categories of traffic calming measures. *Step 1* measures can be implemented on any City street. This category consists of easy to implement, low cost, and often less controversial tools such as: neighborhood traffic safety campaigns, radar speed display units, neighborhood speed watch programs, targeted police enforcement, most sign installations (excluding stop signs and turn-prohibition signs), and pavement striping changes. Because these

measures are less controversial, they can be implemented at the discretion of City staff, and do not require neighborhood consensus building.

Step 2 measures alter the configuration of streets, impede traffic flow, change travel patterns and can be very controversial. These measures are also considerably more expensive than *Step 1* measures. Because *Step 2* measures are designed to alter travel patterns and/or impede traffic flow, they require significant engineering study and community acceptance prior to installation. For this reason, they are not appropriate for all city streets. The streets eligible for *Step 2* measures are described in the following section. *Step 2* measures require the approval of the Public Works Commission. The approved *Step 1* and *Step 2* measures used by the City of San Mateo are summarized on Table 1 and described in detail in Appendix A. Non-approved traffic calming devices will not be considered for neighborhood installation within the City of San Mateo. It is important to note that even through police enforcement is listed as a *Step 1* measure, public safety officers are an integral part of any traffic calming program and will be consulted regularly during a *Step 2* traffic calming study.

This policy applies not only to existing traffic problems in neighborhoods, but to future possible problems as well. The City currently performs traffic impact analyses for each new development. If it is determined that a new project will result in significant impacts that may increase traffic volumes or cut-through traffic in a neighborhood, the traffic calming tools described in this document may be used to offset those impacts. Any traffic calming mitigation to offset impacts caused by new development will be funded by the project developer.

DEFINITION OF A "TRAFFIC CALMING STUDY AREA"

When conducting a *Step 2* traffic calming study, it is necessary to define the area that would be affected/impacted by the installation of a *Step 2* device. There are many ways residents can be affected by a device - they could drive on that street daily, the device may be located on their street, or the device may divert traffic to their street. All residents that live on a neighborhood street within the affected area that could potentially be impacted by the installation of *Step 2* devices must be notified and participate in any *Step 2* traffic calming study. This is what is known as a "Traffic Calming Study Area." These geographic areas are important because they become the limits of the notification area both when a study is being proposed (the petition process) and when a study is underway (the notification and survey processes). Traffic calming study areas will be defined by the Public Works Director prior to beginning the petition process.

Typically, a traffic calming study area is defined using arterial and/or collector streets as boundaries. Sometimes, however, neighborhoods do not have appropriate arterial or collector border streets that can be identified. This results in larger traffic calming neighborhoods than is necessary. Therefore, Public Works staff will use engineering judgment to size the traffic calming neighborhood appropriately for the neighborhood area being considered given the neighborhood street layout and geometrics.

A “Traffic Calming Study Area” is different from a Neighborhood Association. Typically, Neighborhood Associations are large and have many arterial and collector streets running through them. In contrast, traffic calming study areas are much smaller and typically consist of only neighborhood streets bounded by three or four arterials and/or collectors. In essence, traffic calming study areas are confined only to neighborhood streets that would be affected by the installation of *Step 2* measures.

The City of San Mateo exempts four categories of streets from *Step 2* traffic calming:

- Streets designated as “Collectors” or “Arterials” in the City of San Mateo General Plan,
- Streets used as primary response routes for emergency vehicles,
- Streets used as bus routes, and
- Streets designated as “Truck Traffic Routes” as specified in the City Municipal Code.

STREETS NOT ELIGIBLE FOR STEP 2 TRAFFIC CALMING

GENERAL PLAN COLLECTORS AND ARTERIALS

Step 2 traffic calming measures are intended for use on neighborhood streets that are not designated in the City of San Mateo General Plan as *Arterials* or *Collectors* for circulation purposes (see Figure 1). The function of a neighborhood street is fundamentally different from that of an arterial or collector, where the main priority is the efficient movement of through traffic during peak hours. On neighborhood streets, efficiency is much less of a concern because of the limited traffic demand. Instead, the primary concern is livability. Permitting *Step 2* traffic calming devices on collector and arterial streets would undermine the effectiveness of the proposed traffic calming policies and procedures. The purpose of the *Step 2* measures is to change driving behavior within residential areas and to discourage the use of local streets by through traffic. For a residential traffic calming program to be successful, it is essential that collector and arterial streets be defined, designed and maintained for through traffic. Sufficient capacity and appropriate operating conditions must be maintained on these more heavily traveled streets so that traffic is not forced onto local streets and into residential areas. Thus, it can be stated that the purpose of *Step* 2 traffic calming, which is often to reduce traffic volumes and/or speeds, is inconsistent with the primary function of collector and arterial streets.

EMERGENCY RESPONSE ROUTES

Streets designated as emergency response routes serve a special purpose for the city’s residents. In times of emergency, it is imperative that ambulances and fire trucks be given priority on city streets. For this reason, physical traffic calming measures intended to impede traffic flow (chokers, speed cushions, traffic circles etc.) are not appropriate on emergency response routes because they significantly delay emergency vehicles and potentially put lives at risk. Although every street is potentially part of an emergency response route (depending on where the emergency occurs), certain streets provide access between fire stations and large population centers, thereby increasing the probability of an emergency response trip. In these cases, the City of San Mateo has determined that the ability to respond to emergencies outweighs the need for

slower or less traffic on neighborhood streets. Therefore, *Step 2* traffic calming measures will not be considered on designated emergency response routes. These emergency response routes are identified in Table 2, and shown graphically in Appendix B. With a few exceptions, the emergency response routes are also classified as arterial or collector streets, and thus would not be eligible for *Step 2* devices based on that criteria.

In addition to these routes, the proximity of a neighborhood to a hospital will also be considered as part of a traffic calming study. While close proximity to a hospital does not result in the categorical exclusion of *Step 2* measures, it may restrict the type and/or locations of *Step 2* devices. This variable will be considered on a case-by-case basis for each traffic calming study.

BUS ROUTES

Streets used by the county or city bus system are not eligible for most *Step 2* traffic calming devices. Specifically, those devices that would cause a vertical displacement of the bus (speed cushions and raised surfaces), or devices that would impede the ability of a bus to maneuver (barriers, closures, diverters, and circles) would not be permitted on a designated bus route. Since *Step 2* measures impede traffic flow, they would either divert or significantly slow buses, thereby lengthening travel times for bus passengers. Over the long-term, it is counter-productive to create inefficiencies in the local transit system (which encourages the use of single occupant vehicles) while simultaneously attempting to remove automobile traffic from neighborhoods. In addition to increased travel times, traffic calming measures such as speed cushions can result in increased bus maintenance costs and cause significant discomfort for passengers. For these reasons, it is important to promote transit ridership by maintaining unobstructed routes and promoting transit efficiency. Samtrans bus routes in San Mateo and the City shuttle bus routes are shown graphically in Appendix B. In most cases, these routes are located on arterial and collector streets.

TRUCK ROUTES

Streets designated by the San Mateo Municipal Code as Truck Traffic Routes are not appropriate for *Step 2* traffic calming. These streets have been designed specifically to accommodate the special demands of truck traffic. For this reason, these streets are often wider than their counterparts and are constructed with higher load bearing pavement sections. Any attempt to divert truck traffic away from these streets would result in an increased number of trucks on local streets. This could cause pavement damage, unsafe conditions for motor vehicles, and complaints from the surrounding residences and businesses. Truck routes are shown graphically in Appendix B and listed below. These routes are mostly comprised of arterial and collector streets. According to the municipal code, the following streets/segments have been designated as truck routes:

- Route 101 (Bayshore Freeway)
- Route 82 (El Camino Real)
- Route 92 (J. Arthur Younger Freeway)
- East Hillside Boulevard – Bayshore Freeway to El Camino Real

- East Third Avenue – easterly city limits to Route 101
- East Third Avenue – Route 101 to South Claremont Street
- East Fourth Avenue – Route 101 to South Claremont Street
- South Claremont Street – East Third Avenue to Ninth Avenue
- Peninsula Avenue (south side) – Route 101 to El Camino Real
- North Bayshore Boulevard – Peninsula Avenue to East Poplar Avenue

TRAFFIC CALMING CRITERIA

CRITERIA FOR *STEP 1* MEASURES

All streets qualify for *Step 1* traffic calming measures. In order to insure that expensive *Step 2* measures are installed only where necessary, it is City of San Mateo's policy to exhaust all applicable *Step 1* traffic calming measures before applying *Step 2* measures. Because *Step 1* measures are non-controversial and relatively inexpensive, they can be implemented at the discretion of the Public Works Director and do not require public outreach. This allows City staff to respond quickly to neighborhoods where chronic traffic problems exist.

CRITERIA FOR *STEP 2* MEASURES

Step 2 measures may result in significant consequences beyond the street in question. For this reason, the City of San Mateo has developed special *minimum* criteria for the installation of *Step 2* measures. These are described below. The only exception to this is Stop Signs, which are subject to the City of San Mateo *Approved Stop Sign Policy and Procedures.* Changes in these criteria are subject to approval from the City Council and Public Works Commission.

GENERAL CRITERIA FOR *ALL STEP 2* MEASURES

ALL of following general criteria must be met to consider the installation of any *Step 2* traffic calming measure:

- The street must not be designated as an emergency response route, bus route, truck route, or identified as a collector/arterial in the City of San Mateo General Plan.
- An appropriate street location for the device(s) shall be available. Appropriate distance from driveways, manholes, drain inlets, water valves, street monuments, fire hydrants, and other appurtenances shall be considered. Devices shall be installed only where a minimum safe stopping sight distance can be provided. Specific guidelines for speed cushions and round-a-bouts are described later in this chapter.
- A majority of the impacted residents or businesses must support the installation, with higher response rates and support rates on the streets where the traffic calming devices are proposed. This is measured from those who respond to a neighborhood survey.
- The City will make a good faith effort to survey all impacted residents and property owners within the traffic calming study area of the proposed *Step 2* traffic calming

plan. The boundaries of the affected areas as well as the identification of the impacted residents for the survey will be determined by the Public Works Director.

- Installation must not result in traffic diversions to other neighborhood streets greater than what is allowed on the Portland Impact Threshold Curve (see Figure 2). The Portland impact curve is designed to insure that any traffic diversion from one neighborhood street to another would be "non-noticeable," with a couple caveats. It states that streets with almost no daily traffic (100 or less daily trips) could see considerable percentage increases and still have a livable neighborhood and streets that are already heavily impacted by traffic (3,000 trips or more) should not have to deal with even more traffic.
- Though a traffic calming neighborhood is addressed as a whole, engineering judgment must be used when identifying when to use physical traffic calming devices. Thus, unless determined otherwise, only those streets within the neighborhood that meet the *Step 2* thresholds may be considered for physical traffic calming devices. Other streets within the neighborhood may be treated with *Step 1*, non-physical, devices.

These criteria are designed to ensure that those most affected by traffic calming measures are supportive and that suitable locations for the devices exist. Please note that these are minimum criteria. Satisfying the criteria does not necessarily mean that a device will be installed.

STEP 2 SPEED CONTROL CRITERIA

Traffic calming measures designed to reduce speeds include: speed cushions, round-a-bouts/traffic circles, chokers, raised intersections, etc. In addition to the ***General*** criteria stated for all *Step 2* measures, the following criterion must be met to consider the installation of *Step 2* measures intended to slow traffic speeds:

- The 85th percentile speed on a residential street must be greater than 7 miles per hour over the posted speed limit.

The 85th percentile speed is the speed at which 15 percent of the vehicles on the roadway exceed. This measure is important because it is used to determine speed limits, which must be set at reasonable levels to achieve compliance. It is very common for vehicles to exceed the posted speed limits on residential streets. Nationwide studies have shown that the average 85th percentile speed on a residential street is 32 miles per hour. A street would qualify for speed related traffic calming improvements if the three day average speed for any stretch of the street, in either direction of travel, meets or exceeds the 32 mph threshold. Additional counts me be collected by staff if a speed is determined to be within a reasonable range of the 32 mph criteria. Satisfying the criteria does not necessarily mean that a device will be installed.

STEP 2 TRAFFIC DIVERSION CRITERIA

Traffic calming measures designed to create diversions include: turn restrictions, diverters, median islands, etc. In addition to the ***General*** criteria stated for *Step 2*

measures, *both* of following criteria must be met to consider the installation of *Step 2* measures intended to divert roadway traffic:

- The Average Daily Traffic (ADT) volume on the street must exceed 1,000 trips per day. Since traffic counts can fluctuate by ten percent or more on any given day, any study that results in a volume range between 900 to 1,000 trips per day may justify additional traffic analysis.
- At least 25% of the daily traffic on a residential street must be "cut-through."

The City of San Mateo General Plan classifies residential streets as those with less than 1,000 daily trips. This is the amount of traffic generated by 100 single-family homes and has been used as the standard in many other cities in the Bay Area. Thus, if a street has less than 1,000 daily trips, regardless of the origins and destinations of its traffic, it is carrying a reasonable amount of traffic and does not qualify for *Step 2* measures.

The 25% "cut-through" criterion is designed to separate residential streets that, by their design, will carry more than 1,000 daily trips. In these cases, it is important to determine the percentage of traffic generated from within the neighborhood versus that which "cuts-through" the neighborhood. The 25% "cut-through" threshold is based on research of other cities in the Bay Area with similar traffic calming policies. Please note that these are minimum criteria. Satisfying the criteria does not necessarily mean that a device will be installed.

A number of traffic calming improvements are identified in this document as *Step 2* devices. They include physical improvements, both horizontal and vertical in nature, that either divert traffic or cause vehicles to slow. It should be noted that no traffic calming program will be permitted to incorporate any device that affects the ability of the Fire and/or Police Departments to provide effective and efficient emergency services to the community. All traffic calming plans will be reviewed by Fire and Police and specific devices approved on a case by case basis depending on the programs affect on the delivery of emergency services.

Appendix A describes a number of these devices. Of the *Step 2* devices, the most commonly used are the speed cushion and the traffic circle. These devices require further consideration in addition to the general speed and diversion criteria. Below is a listing of the additional criteria that must be met for the safe and successful installation of a speed cushion or traffic circle.

ADDITIONAL *STEP 2* CRITERIA – SPEED CUSHIONS

In addition to the ***General*** *and* ***Speed Control*** criteria, the following guidelines should be considered for the installation of speed cushions along with engineering judgment:

- The street should have adequate existing curb and gutter on each side to prevent ponding of water in the area of the speed cushion.

- The affected street segment should be of an adequate length for a speed cushion to be effectively installed. Typically, a minimum length of 300 - 500 feet is desirable.

- The first speed cushion in a series should be located in a position where it can not be approached at high speed in either direction. To achieve this, the first hump ideally should be located approximately 200 feet from an intersection stop sign.

- Where possible, speed cushions should not be placed on curves, but on tangent stretches of roadway. However, in areas where placement on curves is unavoidable, proper horizontal and vertical sight distance should be provided.

- Speed cushions should be located at or near residential property lines and away from driveways, when possible.

- Speed cushions should be located near street lights to illuminate them for safe bike and pedestrian activity at night.

- Speed cushions should be accompanied by the appropriate advanced signage and street markings.

- Spacing between speed cushions should be as even as possible to produce uniform speed along an entire street. Speed cushions in a series should be placed between 200 and 600 feet apart, which may vary depending on the length of the street segment where the devices are placed. Typically, speed cushions are placed farther apart on longer segments than shorter segments. Spacing should allow at least one speed cushion on each block.

- The existence of Class II or Class III bicycle facilities should be taken into consideration when placing speed cushions in a neighborhood.

As a practical matter, these guidelines cannot always be met. For this reason, these guidelines are subject to review by the Public Works Director, who may modify these criteria in a particular situation to achieve the desired result – the safe and effective application of the speed cushion(s).

ADDITIONAL *STEP 2* CRITERIA - TRAFFIC CIRCLES AND ROUNDABOUTS

In addition to the ***General*** and ***Speed Control*** criteria, the following guidelines should be considered for the installation of roundabouts and traffic circles along with engineering judgment (see also Figure 3):

- Intersection should be a minimum of 55 feet diagonally across (both directions, measured from curb face).

- Crosswalk should be located a minimum of 12-feet from the interior circle (measured from curb face of circle to white stripe of crosswalk).

- Device should allow for a minimum 22-foot wide travel lane for circulating traffic (measured curb face of interior circle to the curb return).
- Interior diameter of circle should be a minimum of 10 feet (measured curb face to curb face).
- Traffic circles should not be used in conjunction with stop signs at a given location.
- Intersection should meet minimum approach volume criteria as prescribed by established traffic engineering publications.
- Device should be installed with vertical curb (not rolled curb).
- Device should allow for proper sight distance across the intersection.
- Existing utilities and access to maintenance facilities, such as manholes, should be accommodated when determining what material is to be used within the traffic circle or roundabout.

As a practical matter, these guidelines cannot always be met. For this reason, these guidelines are subject to review by the Public Works Director, who may modify these criteria in a particular situation to achieve the desired result – the safe and effective application of traffic circles and roundabouts.

PROGRAM THRESHOLDS

Since distinct traffic calming devices are available to address either speed or volume issues within a neighborhood, staff has the flexibility to use discretion on the exact threshold limits. Either threshold, either speed or diversion, may be used when developing a traffic calming program to better pinpoint the concerns of a neighborhood and directly concentrate on a solution to address the concern. Thus, a neighborhood that has speeding concerns, and which meets the speed threshold, may develop a program that only includes speed control devices.

Typically, mid-week traffic counts, when any nearby school is in session, will provide results that show the highest values for speed and volume on a neighborhood street. Thus, to determine the worst case for traffic on a neighborhood street, traffic counts will be collected for a three day, mid-week period when an adjacent school (if any) is in session.

CEQA REVIEW OF TRAFFIC CALMING PLAN

Depending on which *Step 2* traffic calming devices are used in a traffic calming plan, diversion may occur on adjacent streets, or in adjacent neighborhoods. For programs where extensive diversion is expected, the City Council must approve an environmental review of the traffic calming plan as required by the California Environmental Quality Act (CEQA).

3.
TRAFFIC CALMING PROCEDURES

One of the primary interests in developing a neighborhood traffic calming policy is to provide a clear structure for addressing the concerns of the city's neighborhoods while spending an appropriate amount of staff time to address neighborhood traffic concerns. Traffic concerns may exist throughout an entire neighborhood or may be specific to a particular street, roadway segment, or spot location. The process developed by the City of San Mateo allows for the timely implementation of non-controversial *Step 1* traffic calming measures and a comprehensive public outreach effort for requests of a more controversial nature. The overall traffic calming process is outlined on Figure 4.

PROCESS INITIATION

The traffic calming process begins with a specific request to the Public Works Department from a neighborhood resident by letter, phone call, or email. After determining the nature of the request, City staff will undertake the following procedure (Requests for Stop Signs are undertaken in accordance with the adopted Stop Sign Policy and Procedures document):

1. Forward a copy of the city's traffic calming policy & procedures to the resident and ask the resident to file a traffic calming request form (see Figure 5).

2. After receipt of the completed form, staff will review the street in question, and implement *Step 1* traffic calming improvements accordingly.

3. Following a period of time for traffic to normalize given the installation of the *Step 1* improvements (usually 1 to 3 months), Public Works engineering staff will conduct a traffic study to determine if the traffic calming thresholds are met. If the resident's concerns are abated through the use of *Step 1* traffic calming measures during this test phase, no further action is then necessary. If this is done, the resident must wait a minimum of six months to again request traffic calming improvements.

4. If either or both traffic calming thresholds are met, the neighborhood support process is commenced as described below.

5. If the petition process is successful, City staff conducts additional traffic analysis to determine if any of the other streets within the defined traffic calming study area meet the thresholds for *Step 2* traffic calming devices. Only those streets that meet the thresholds are eligible for the installation of physical *Step 2* traffic calming devices. *Step 1* improvements may be applied to non-qualifying streets within the study area.

NEIGHBORHOOD SUPPORT PROCESS

Traffic calming studies require considerable staff resources at taxpayer expense. For this reason, it is important that a significant portion of the neighborhood supports the undertaking of a study. The neighborhood support process is reserved for *Step 2* concerns that meet ***Speed Control and/***or ***Traffic Diversion*** criteria. Neighborhood endorsement is demonstrated through a resident petition **and** by gaining the support of the local Home Owners'/Neighborhood Association (HOA/NA). These are described below.

TRAFFIC CALMING NEIGHBORHOOD DETERMINATION AND STUDY AREA PETITION

The petition process is necessary to determine whether a resident's concern is widespread. It also serves as a process for the neighborhood residents to elect representatives. When conducting a petition, City staff and the resident work together to define the traffic calming study area, which becomes the designated notification area boundaries for all future contact with the residents within the study area. Though the limits of the study area are determined through a collaborative process with staff and the neighborhood, the Public Works Director shall make the final determination of the traffic calming neighborhood boundary limits should the need arise. The study area is typically bounded by arterials and collectors, but staff may use engineering judgment to limit streets from the neighborhood that are far removed from the problem area or would not by impacted by any proposed improvements. Staff will supply the resident with a highlighted map identifying the limits of the petition area and a petition form (see Figure 6). It is the resident's responsibility to collect signatures from as many residents, property owners, and/or businesses in the study area as possible. One signature is collected per property, except in the case of tenants, where each tenant is given one signature in addition to that of the property owner.

HOA/NA SUPPORT

If the traffic calming study area lies within the geographic boundaries of one or more Home Owners'/Neighborhood Associations, the petitioner will demonstrate that the local Association(s) supports the proposed review of traffic calming improvements for the neighborhood. A map showing the boundaries of all Home Owners'/Neighborhood Associations within the City is available at the San Mateo City Hall. A letter of

endorsement from each Home Owners'/Neighborhood Association located within the designated study area boundary is necessary.

NOTICING GUIDELINES

Neighborhood participation is important in the development of a traffic calming plan, but even more critical is a clear understanding of the appropriate level of participation. Where it may be suitable for a resident that lives on a street adjacent to one considering traffic calming improvements to attend an informational meeting or even participate on a steering committee, it is appropriate for only those property owners directly affected to vote an approval of a program. The various levels of community involvement are identified in the table below:

	Noticing for Neighborhood Meeting	Noticing of Public Hearings with PWC and CC	Vote on Neighborhood Traffic Calming Plan	Participate on the Traffic Calming Steering Committee
Residents on local streets within the traffic calming neighborhood	YES	YES	YES	YES
Residents on streets considered the boundary of the traffic calming neighborhood	YES	YES	NO	YES
Residents on streets in neighborhoods adjacent to the traffic calming neighborhood	NO	YES	NO	NO
HOA/NA encompassing the traffic calming neighborhood	YES	YES	Letter of support from HOA/NA required to commence process	Yes, HOA/NA may have representative sit on steering committee

PRIORITIZING TRAFFIC CALMING REQUESTS

Upon successful completion of the petition and local HOA/NA approval, City staff will prioritize each neighborhood's *Step 2* request in the order each completed program request is submitted. The City of San Mateo establishes a fixed budget each year for neighborhood traffic calming measures. The number of studies undertaken each year is subject to the City traffic calming budget and staff availability.

STEP 2 PROGRAM DEVELOPMENT

OUTREACH AND PUBLIC PARTICIPATION

The City of San Mateo recognizes that resident participation is a critical element of the *Step 2* phase. For this reason, staff will conduct an outreach forum within the neighborhood. This includes:

- Inviting the residences and businesses in the affected area to a neighborhood meeting to introduce traffic calming program concepts,
- Selection of a neighborhood traffic calming steering committee and committee chair to develop the *Step 2* program.

At the first steering committee meeting, Public Works and any other appropriate department staff will train the committee on the various traffic calming concepts and functions of the traffic calming devices, and to address any questions. Subsequent steering committee meetings are held until consensus is reached on a program. It is not essential that City staff participate in these subsequent steering committee meetings, though Public Works, Police and Fire Department staff will be available to assist the steering committee during plan development to guide the plan development toward a plan that is consistent with the adopted traffic calming policies while not adversely impacting the delivery of emergency services. If City staff is not included on a regular basis, periodic informal reviews of plans being considered by the steering committee are recommended. If necessary, follow-up neighborhood meetings may be held by the steering committee to gauge neighborhood support on a particular concept or traffic calming device.

DEPARTMENT REVIEW OF TRAFFIC CALMING PLAN

When consensus is reached and a traffic calming plan is finalized by the steering committee, the plan must be reviewed by the various City departments that may have an interest in the elements of the program. These departments include:

- Public Works Engineering – Evaluation of the traffic plan elements on the City right-of-way and review of the plan costs to determine if within available budget.
- Planning Division – CEQA Evaluation (if necessary)
- Parks and Recreation – Evaluation of any landscaping and irrigation contained within plan elements
- Police Department – Evaluation to determine if the plan elements can be implemented without any detrimental affect to the delivery of emergency services.
- Fire Department – Evaluation to determine if the plan elements can be implemented without any detrimental affect to the delivery of emergency services.
- Public Works Maintenance Division – Evaluation to determine plan's affect on street sweeping, access to utilities and/or maintenance facilities (manholes).

Through review of the plan by the various City departments the following issues may be considered by City staff and discussed with the program proponents:

- Effectiveness of the selected traffic calming devices
- Effects on the ability of Police and Fire to successfully provide emergency services to the area
- Noise impacts
- Loss of parking
- Liability exposure implications
- Visual impacts and aesthetic concerns
- Increased maintenance costs

Any comments on the traffic calming plan must be addressed through appropriate modification to the traffic calming plan. The plan may not proceed forward unless supported by all interested City departments.

NEIGHBORHOOD MEETING TO INTRODUCE TRAFFIC CALMING PLAN

Once the traffic calming plan has been approved by all interested City departments, a neighborhood meeting is scheduled to introduce the plan and answer any questions. Public Works staff introduces the traffic calming program, and the neighborhood plan is presented by the steering committee. If substantial opposition is received on the plan, the steering committee may elect to take the plan back for revision.

SURVEY OF NEIGHBORHOOD FOR PROGRAM SUPPORT

As the final step in the public outreach process, the affected street within the traffic calming neighborhood is polled using a secret ballot to determine neighborhood support for the *Step 2* traffic calming plan. Voting on a Step 2 traffic calming plan shall be as follows:

- One vote per single family residence
- One vote per multi-family residence
- One vote per apartment unit
- One vote per business

One vote is allowed for each owner of property within the neighborhood who is a non-resident (one vote regardless of the number of developed or undeveloped properties owned).

The results of the traffic calming survey are then summarized in a staff report and presented to the Public Works Commission for consideration. Should the results of the traffic calming survey not prove favorable for program approval, no further action is taken on the traffic calming program unless otherwise approved by the Director of Public Works.

PUBLIC WORKS COMMISSION PROGRAM REVIEW

The results of the traffic calming survey are presented to the Public Works Commission (PWC) along with a staff recommendation. Noticing of the public hearing is done per

the Noticing Guidelines identified above. Upon approval of the traffic calming plan by the PWC, the traffic calming measures will be designed and construction documents prepared. The devices will be installed when funding is approved by the City Council.

CITY COUNCIL APPROVAL OF PROGRAM FUNDING

During each budget cycle, approved programs will be presented to the City Council for funding consideration. Staff will recommend approved programs on a prioritized basis according to the date approved by the Public Works Commission. There is no guarantee that a program will receive funding solely based on neighborhood and Public Works Commission approval. Any approved program that does not receive Council approval for construction funding will have to compete with approved projects requesting funding during the next budget funding cycle.

SCHEDULE

Neighborhood traffic calming studies do not lend themselves to predictable schedules. The timing of events varies considerably from case to case. Considerations that affect program timing include:

- Size of area and complexity of plan alternatives,
- Time necessary to obtain required petition signatures,
- Difficulty in scheduling representative community meetings,
- Ability of the steering committee to reach consensus,
- Scale and complexity of final design and construction contract requirements,
- Funding availability,
- Weather effects on construction season, and
- Competing demands on staff resources.

Although it is conceivable that a relatively simple project could be completed in as little as 12 months from qualifying petition to installation, as a practical matter, a project duration in excess of 18 months to two years would not be uncommon.

TRAFFIC CALMING BUDGET

The City's Traffic Mitigation Report allows for the use of traffic mitigation funds for traffic calming improvements. The amount available for traffic calming will be allocated during each five year CIP funding cycle.

DEVICE REMOVAL

The neighborhood must petition the City to have the devices removed. The ensuing process to remove the devices would be very similar to the initial traffic calming program development in terms of public outreach, engineering study, and neighborhood support. Should a neighborhood successfully manage a request for removal of a traffic calming device through this process, they will be responsible for the cost associated with the removal of the device.

TABLES AND FIGURES

TABLE 1
Summary of Traffic Calming Methods

Method	Step	Beneficial Effects			Undesirable Effects					Cost*
		Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance	
Community Outreach/Education	1	Possible	Possible	Possible	No	No	No	No	No	Varies
Police Enforcement of Speed Limits	1	Yes	Yes	Possible	No	No	No	No	No	$75 per hour
Speed Display Units	1	Yes	Possible	No	No	No	No	No	No	$250 per day
High Visibility Crosswalks	1	Possible	Possible	No	No	Possible	No	No	Yes	$1,000-$5,000
Speed Limit Signs	1	Possible	Possible	No	No	No	No	No	No	$200 per sign
Narrow Lane Striping	1	Yes	Yes	Possible	No	No	No	No	Yes	$1,000-$3,000
Stop Signs	2	Possible	Possible	No	Yes	Possible	No	Yes	No	$200 per sign
Turn Restriction Signs	2	No	Possible	Yes	Possible	No	Yes	No	No	$200 per sign
Curb Extensions	2	Yes	Yes	Possible	No	Yes	No	Yes	Possible	$10,000-$20,000
Speed Cushions & Raised Surfaces	2	Yes	Yes	Yes	Yes	Possible	No	Yes	Yes	$5,000-$50,000
Traffic Circles & Round-a-bouts	2	Yes	Yes	Possible	No	Yes	No	Yes	Yes	$25,000-$35,000
Median Barriers	2	Possible	Possible	Yes	No	No	Yes	Yes	Possible	$5,000-$30,000
Channelization	2	Yes	Yes	Possible	No	Yes	Yes	Yes	Possible	$15,000-$20,000
One-Way Street Conversions	2	No	Possible	Possible	No	No	Yes	No	No	$5,000-$10,000

*These costs represent device construction and/or installation costs. They do not include program development or CEQA review.

TABLE 2
Emergency Response Routes

Emergency Response Lanes	Routes (From – To)
Alameda de las Pulgas	Crystal Springs Road to City Limits
B Street	1st Avenue to South Boulevard
Barneson Avenue	Alameda de las Pulgas to El Camino Real
Barriolhet Avenue	El Camino Real to City Limits
Crystal Springs Road	El Camino Real to City Limits
De Anza Boulevard	Polhemus Road to Hillsdale Boulevard
Delaware Street	Peninsula Avenue to 25th Avenue
El Camino Real	City Limits to City Limits
Fourth Avenue	El Camino Real to Norfolk Street
Grant Street	5th Avenue to Fashion Island Boulevard
Hacienda Street	22nd Avenue to 40th Avenue
Hillsdale Boulevard	East City Limits to Del Monte Place
Humboldt Street	Peninsula Avenue to 10th Avenue
J. Hart Clinton Drive	Norfolk Street to City Limits
Kehoe Avenue	Highway 101 to Lake Street
Maple Street	Barneson Avenue to Fifth Avenue
Norfolk Street	Huron Avenue to Los Prados Street
Pacific Boulevard	South City Limits to Hillsdale Boulevard
Palm Avenue	9th Avenue to 25th Avenue
Poplar Avenue	Glendale Road to Highway 101
Third Avenue	Parrott Drive to Norfolk Street
Saratoga Drive	Delaware Street to Hillsdale Boulevard
28th Avenue	Hacienda Street to 31st Avenue
Roberta Drive	Norfolk Street to Kehoe Avenue

FIGURE 1
San Mateo General Plan Functional Street Classification

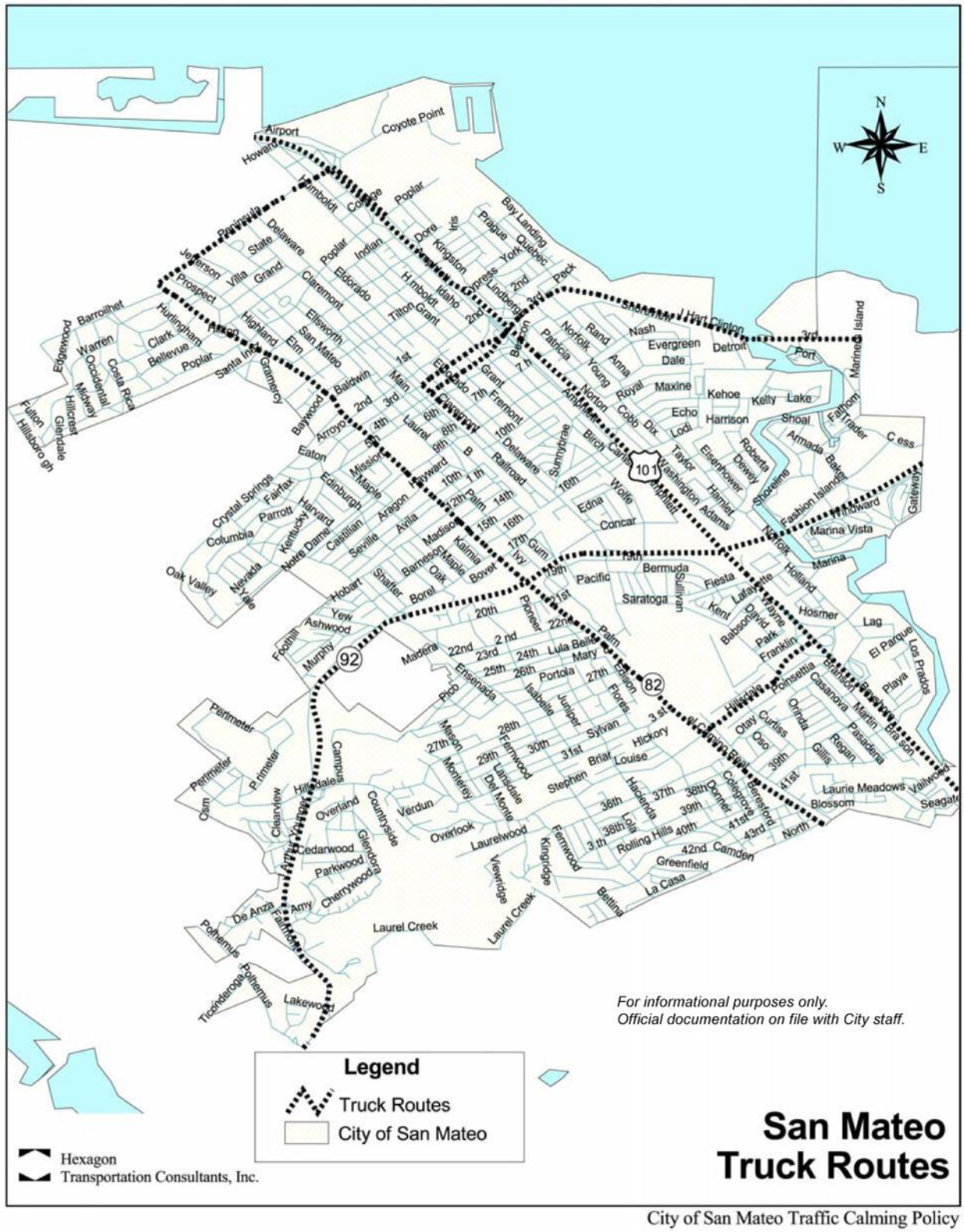
City of San Mateo Traffic Calming Policy

FIGURE 2

San Mateo Emergency Response Routes

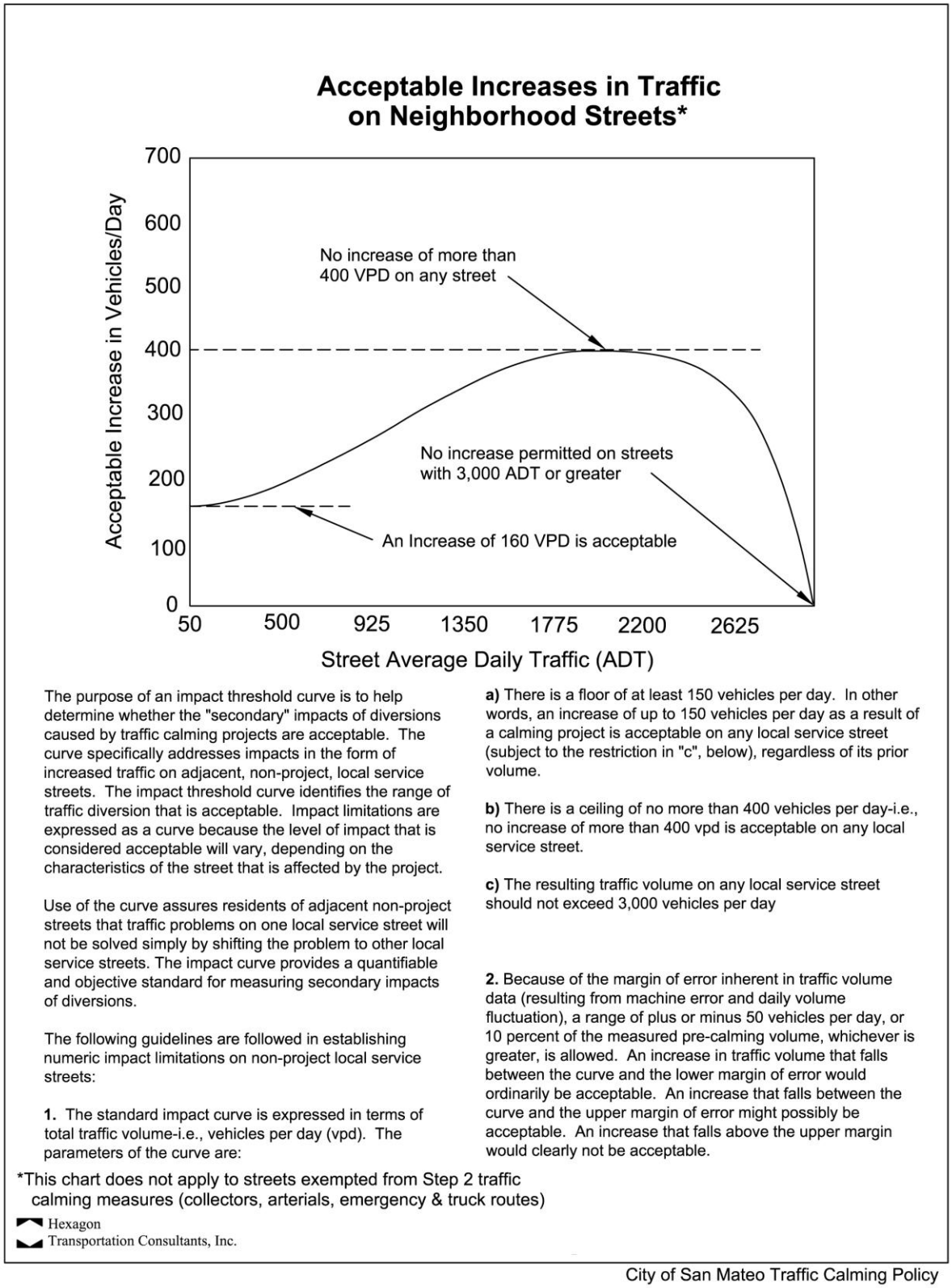
FIGURE 3

San Mateo Truck Routes



City of San Mateo Traffic Calming Policy

FIGURE 4
Portland Impact Threshold Curve



The purpose of an impact threshold curve is to help determine whether the "secondary" impacts of diversions caused by traffic calming projects are acceptable. The curve specifically addresses impacts in the form of increased traffic on adjacent, non-project, local service streets. The impact threshold curve identifies the range of traffic diversion that is acceptable. Impact limitations are expressed as a curve because the level of impact that is considered acceptable will vary, depending on the characteristics of the street that is affected by the project.

Use of the curve assures residents of adjacent non-project streets that traffic problems on one local service street will not be solved simply by shifting the problem to other local service streets. The impact curve provides a quantifiable and objective standard for measuring secondary impacts of diversions.

The following guidelines are followed in establishing numeric impact limitations on non-project local service streets:

1. The standard impact curve is expressed in terms of total traffic volume-i.e., vehicles per day (vpd). The parameters of the curve are:

a) There is a floor of at least 150 vehicles per day. In other words, an increase of up to 150 vehicles per day as a result of a calming project is acceptable on any local service street (subject to the restriction in "c", below), regardless of its prior volume.

b) There is a ceiling of no more than 400 vehicles per day-i.e., no increase of more than 400 vpd is acceptable on any local service street.

c) The resulting traffic volume on any local service street should not exceed 3,000 vehicles per day

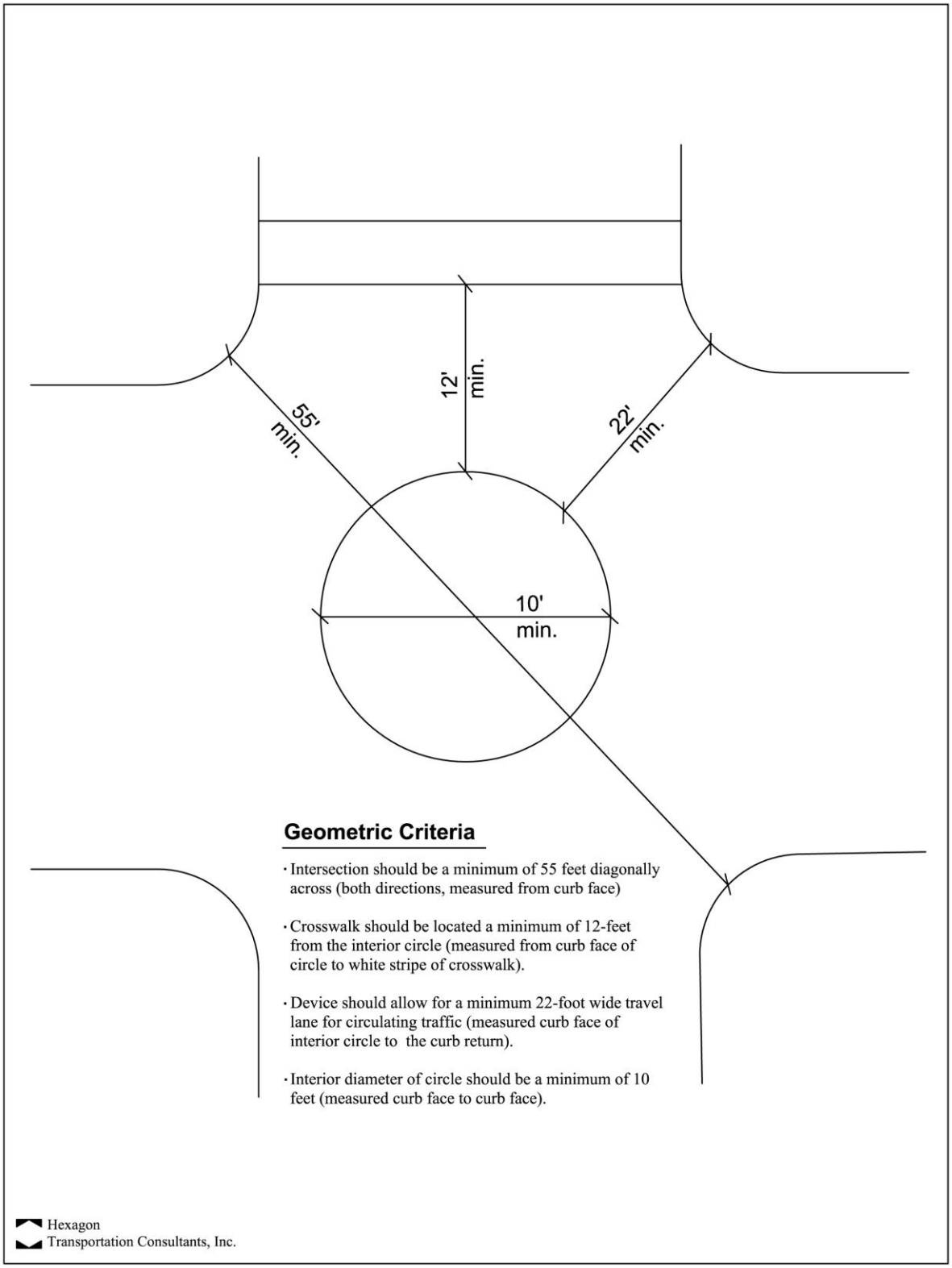
2. Because of the margin of error inherent in traffic volume data (resulting from machine error and daily volume fluctuation), a range of plus or minus 50 vehicles per day, or 10 percent of the measured pre-calming volume, whichever is greater, is allowed. An increase in traffic volume that falls between the curve and the lower margin of error would ordinarily be acceptable. An increase that falls between the curve and the upper margin of error might possibly be acceptable. An increase that falls above the upper margin would clearly not be acceptable.

*This chart does not apply to streets exempted from Step 2 traffic calming measures (collectors, arterials, emergency & truck routes)

Hexagon
Transportation Consultants, Inc.

City of San Mateo Traffic Calming Policy

FIGURE 5
Traffic Circle and Roundabout Criteria



City of San Mateo Traffic Calming Policy

FIGURE 6
Traffic Calming Procedure

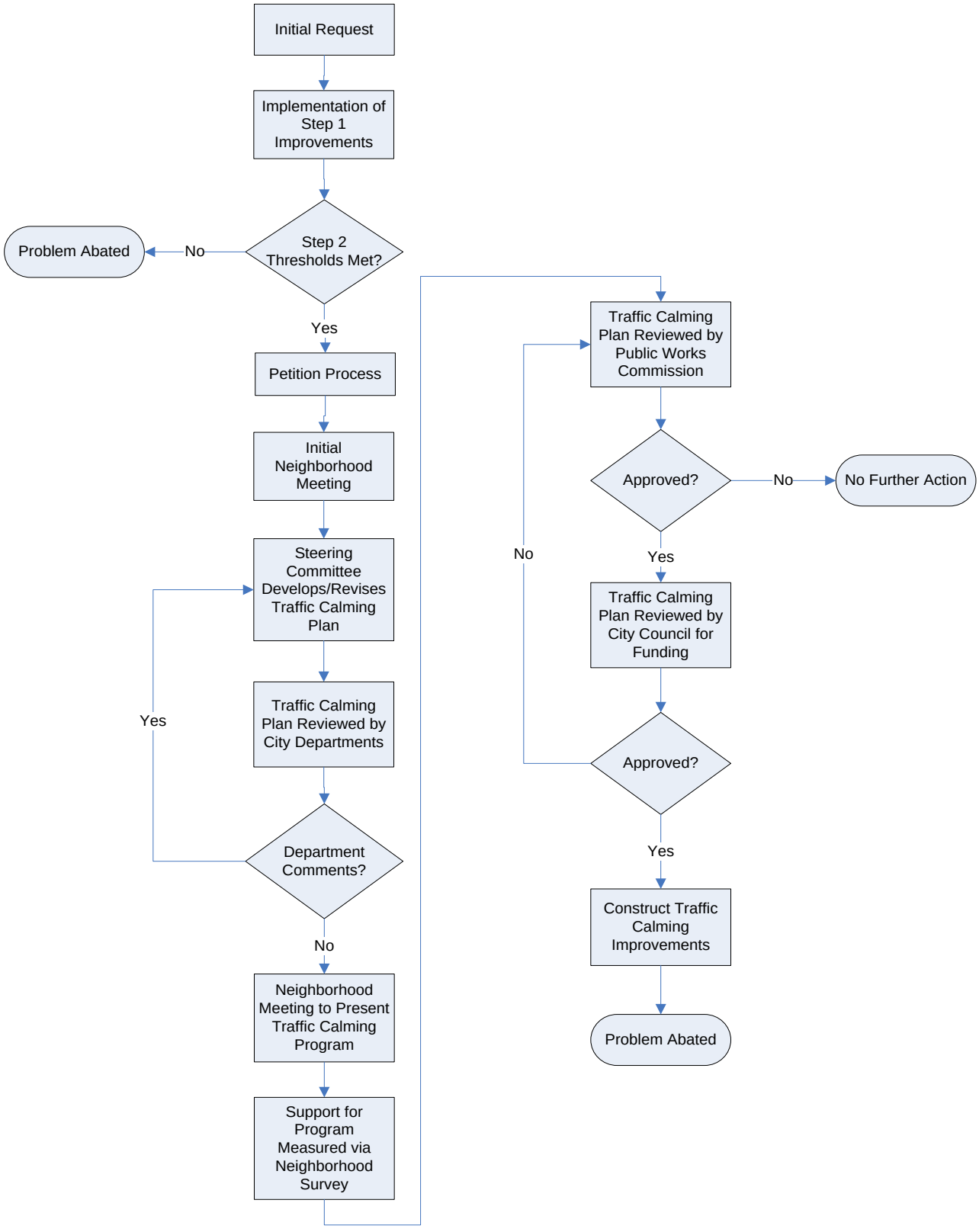


FIGURE 7
Traffic Calming Request Form

The purpose of this form is to enable neighborhoods to request the possible initiation of a traffic calming study in accordance with the City of San Mateo's Neighborhood Traffic Calming program. The form must be filled out in its entirety and submitted to:

The City of San Mateo
Public Works Department
330 West 20th Street
San Mateo, California 94403

Feel free to attach additional sheets containing pictures, maps, or additional text if the space provided is insufficient.

1. Requesting Individual's Contact Information

Name: _____

Address: _____

Phone Number: _____

Email (optional):_____

2. Please describe the location of the traffic concern (feel free to draw a picture or attach a map):

_____
_____
_____

3. Please describe the nature of the neighborhood traffic problem you are concerned with (attach additional sheets if necessary):

_____
_____
_____
_____
_____

4. Please describe what changes you would like to see on your street and/or what traffic calming measures would be acceptable to you:

_____
_____
_____
_____
_____

FIGURE 8
Neighborhood Petition Form

City of San Mateo

Petition for Neighborhood Traffic Calming Measures

THE UNDERSIGNED BELOW AGREE TO THE FOLLOWING:

1. All persons signing this petition do hereby certify that they reside within the impacted area, which is hereby defined as the street segments of (also see attached map):

_____
_____
_____

2. All persons signing this petition request that the City of San Mateo investigate the plausibility of installing physical traffic calming devices on my street in this neighborhood:

_____
_____
_____

3. All persons signing this petition do hereby agree that the following contact person(s) represent the neighborhood as facilitator(s) between the neighborhood residents and City of San Mateo staff in matters pertaining to items 1 and 2 above:

Name: _____
Address: _____
_____
Phone #: _____
Name: _____
Address: _____
_____
Phone #: _____
Name: _____
Address: _____
_____
Phone #: _____

ONLY ONE SIGNATURE PER ADDRESS

Name (Please Print)
Address
Phone Number
Signature

1._____
_____
_____
_____
2._____
_____
_____
_____

APPENDIX A

TRAFFIC CALMING TOOLBOX

COMMUNITY OUTREACH/EDUCATION

Step 1

Description: Community outreach involves neighborhood awareness and education campaigns on traffic and traffic safety issues. Campaigns can consist of neighborhood meetings, written correspondence, school safety workshops, or other programs that help inform and educate the public.

Advantages:

- Provides a forum for residents to discuss their concerns.
- Helps city staff and neighborhood representatives to identify traffic problems in the community.
- Educates the community on traffic calming and safety.

Disadvantages:

- Limited effectiveness.
- Cultural and language barriers may dissuade resident participation.
- Potentially time consuming.

Special Considerations:

- Neighborhood meetings are typically h
  work hours.
- The meetings are intended to promote
- When necessary, interpreters should b

Reduces Speed	Improves Safety	Reduces Volume	Increase Noise	Loss	Access	Response	ses et Maintenance
Possible	Possible	Possible	No	No	No	No	No

Objective: To educate and inform the community of traffic calming measures and traffic safety in their neighborhoods.

Cost: Varies.

POLICE ENFORCEMENT OF SPEED LIMITS

Step 1

Description: The police department deploys officers to target neighborhood streets with reported speeding problems.

Advantages:

- Increases driver awareness.
- Targets speeding areas.
- Can reduce speeding occurrences.
- Only impacts speeding offenders.
- Can be implemented immediately.

Disadvantages:

- Long term beneficial impacts may diminish if not regularly enforced.
- Requires frequent police presence, which may not feasible.

Special Considerations:

- Requires frequent enforcement to be successful.
- Police units may not be readily available.
- Often beneficial in school zones.
- Typically, only streets with documented speeding problems should be monitored.
- May be used in combination with recently implemented control devices.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Yes	Possible	No	No	No	No	No

Objective: To increase driver awareness of speed limits through police enforcement.

Cost: $75 per hour for police officer.

SPEED DISPLAY UNITS

Step 1

Description: A radar unit that displays the speed limit and motorists' actual speeds. May be movable or permanent.

Advantages:

- Increases driver awareness of their actual speeds.
- Can be implemented immediately.
- Conveys illusion of police presence.

Disadvantages:

- Limited effectiveness.
- Display units must be relocated daily.
- Does not provide solid enforcement.

Special Considerations:

- Can cause motorists to speed up to register a higher speed.
- Not suitable for remote areas.
- Usually not effective on high volume streets.
- Helps alert drivers of their actual speed and provides an opportunity for drivers to reduce speeds without being penalized.
- Permanent units usually only considered around schools

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Possible	No	No	No	No	No	No

Objective: To reduce speeding by altering drivers of their actual speeds.

Cost: Temporary units: $250 per day.
Permanent units: $10,000 per installation.

HIGH VISIBILITY CROSSWALKS

Step 1

Description: A crosswalk incorporating a striped pattern that catches motorists' attention. However, it is City policy to discourage such crosswalks at mid-block locations (at intersections is okay). Studies have shown that these devices when placed mid-block tend to give pedestrians a false sense of security.

Advantages:

- Increases crosswalk viability.
- Could help to reduce speeds.
- Indicates preferred crossing location.

Disadvantages:

- Could create a false sense of pedestrian security.
- Can only be used at uncontrolled crosswalks.

Special Considerations:

- Pedestrian may ignore traffic and pla
- More difficult to maintain than regula
- Should be well lit
- While less expensive than raised cro
- Not suitable for all locations.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise				
Possible	Possible	No	No	Possible	No	No	Yes

Objective: To increase crosswalk visibility to drivers.

Cost: $1,000 to $5,000 each.

SPEED LIMIT SIGNS AND LEGENDS

Step 1

Description: Speed limit signs and legends installed on residential streets.

Advantages:

- Can help reduce speeding if enforced.
- Clearly defines speed limit.
- Acceptable by neighborhood.
- Relatively inexpensive to install.

Disadvantages:

- Can be ignored by motorists.
- Requires on-going enforcement.
- Added signage to neighborhood.

Special Considerations:

- An engineering analysis is needed to establish speed limits higher than 25 mph.
- Requires enforcement to remain effective.
- Motorists have a tendency to disregard unrealistically low speed limits.
- Should be used only on streets with identified speeding problems.
- Speed limit signs will not be posted less than 25 mph.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Possible	Possible	No	No	No	No	No	No

Objective: To reinforce proper speeds on neighborhood streets.

Cost: $200 per sign or legend.

NARROW LANE STRIPING

Step 1

Description: Narrowing lanes requires restriping the pavement to reduce the width of the lanes (usually to 10 feet wide).

Advantages:

- Slows travel speeds.
- Easy to modify and implement.
- Increases safety.

Disadvantages:

- Increases maintenance costs and frequency.
- Adds striping to neighborhood streets.

Special Considerations:

- The remaining portion of the road can be used to create bicycle or parking lanes.
- Additional striping helps define neighborhood streets by adding centerlines and edge lines.
- Raised dots can be used on curved areas.
- Can be altered over time.
- Possible to use as an intermediate step to more definite traffic control devices.
- Most effective when used in combination with other devices or placed in series on short blocks.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Yes	Possible	No	No	No	No	Yes

Objective: To slow vehicle speeds by narrowing traffic lanes.

Cost: $1,000 to $3,000, depending on length of street.

STOP SIGNS

Step 2

Description: Stop signs assign right-of-way at intersections and require motorists to stop and check traffic before crossing.

Advantages:

- Assists pedestrian and bicycle crossings.
- Lowers speed at stop sign location.
- Requires traffic to stop at an intersection.
- Can help reduce accidents at an intersection, such as broad-sides.

Disadvantages:

- Can be problematic if unwarranted.
- May increase emergency response times.
- Increase noise and air pollution.
- Increase delay at an intersection.
- May encourage higher mid-block speeds to compensate for time lost.

Special Considerations:

- Stop signs should only be installed if warranted.
- Unwarranted stop signs can create problems.
- Drivers may not come to a complete stop, or stop at all, at low volume intersections.
- May increase some types of collisions such as rear-ends.
- Police enforcement increases compliance with stop signs.
- Vehicle acceleration and deceleration near a stop sign will increase noise.
- City has an adopted policy for sign application

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Possible	Possible	No	Yes	Possible	No	Yes	No

Objective: To establish right-of-way at intersections and improve traffic safety.

Cost: $200 per approach.

TURN RESTRICTION SIGNS

Step 2

Description: Turn restriction signs prohibit specified turn movements on neighborhood streets. Examples of restrictive signage include: “No Left Turns”, “No Right Turns”, or “Do Not Enter”.

Advantages:

- Cost-effective method of reducing cut-though traffic.
- Redirects traffic to main streets where higher traffic volumes are acceptable.
- Can be directed towards certain times of the day.
- Can reduce noise.
- No increase to street maintenance.

Disadvantages:

- Possible traffic diversion to other neighborhood streets.
- Success requires enforcement.
- Adds signage to the neighborhood.
- Limits access to the neighborhood.
- Applies to all traffic, including neighborhood traffic.

Special Considerations:

- Signage can allow a trial period.
- Little or no effect on vehicle speeds.
- Best when used on major or collector s
- More effective when applied to certain
- May cause access impacts to neighbo
- Possible diversion of traffic to other nei
- Can be difficult to enforce in some area

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise				ses t ance
No	Possible	Yes	Possible	No	Yes	No	No

Objective: To reduce traffic volumes on neighborhood streets and redirect traffic to main roadways.

Cost: $200 per sign.

CURB EXTENSIONS

Step 2

Description: Curb extensions narrow a portion of the roadway by extending a portion of the curb into the street. Curb extensions are commonly referred to as “chokers” and “bulb-outs”. Curb extensions also include “Chicanes”, which are a series of alternating curb extensions.

Advantages:

- Shorter pedestrian crossings.
- Can decrease vehicle speeds entering a narrowed roadway.
- Creates an opportunity for landscaping.
- Allows better pedestrian visibility around parked cars.

Disadvantages:

- May require loss of on-street parking.
- Can create a hazard for bicyclists.
- Impedes emergency response vehicles and other trucks.
- Increased maintenance.
- Drainage can be a problem.

Special Considerations:

- Expensive to remove if permanent
- Curb-extensions can be installed mid-block.
- May require additional landscaping.
- Can be expensive.
- Curb-extensions should not extend into designated bicycle lanes.
- At transit stops, curb-extensions enhance service.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Yes	Possible	No	Yes	No	Yes	Possible

Objective: To reduce traffic speeds and increase driver and pedestrian safety.

Cost: $10,000 to $20,000 per extension.

SPEED CUSHIONS & RAISED SURFACES

Step 2

Description: Speed cushions are asphalt mounds constructed on the roadway surfaces. Typically, they are 3 inches high and 14 feet long. Other raised surfaces include raised crosswalks and raised intersections.

Advantages:

- Effectively slow vehicles.
- Can result in decrease of traffic volumes.
- Can improve pedestrian safety

Disadvantages:

- Slows emergency response times.
- Increases noise near speed cushions.
- Can result in traffic diversion to other neighborhood streets.
- Somewhat aesthetically displeasing.
- Possible problem for bikes

Special Considerations:

- Speed cushions are usually placed 300 to 600 feet apart.
- Speed cushions used on residential streets are more gradual than those commonly found in shopping center parking lost.
- Results in 3-5 second delay for fire trucks, and 10 second delay for emergency response times.
- Require advanced warning signs.
- Can be difficult to precisely construct.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Yes	Yes	Yes	Possible	No	Yes	Yes

Objective: To reduce vehicle speeds on neighborhood streets.

Cost: Speed cushions **-** $5,000 each. Raised Crosswalks - $5,000 to $10,000 each. Raised Intersections - $25,000 to $100,000 each.

ROUNDABOUTS & TRAFFIC CIRCLES

Step 2

Description: Roundabouts and traffic circles are raised circular islands placed in the center of an intersection. They require vehicles to slow down to a comfortable speed in order to maneuver around the circle.

Advantages:

- Effectively reduces vehicle speeds.
- Reduces potential for collisions.
- Provides increased access for side streets.
- Opportunity for landscaping.
- Minimal noise impacts.
- Can be attractive, if well maintained.

Disadvantages:

- Loss of parking.
- Can disrupt access for large vehicles.
- Very expensive
- Possible decrease in emergency response times.
- Can increase conflicts between bicycles and automobiles.
- Can require increased maintenance.

Special Considerations:

- Requires additional signage and pavement markings.
- Less effective at T-intersections and offset intersections.
- Most effective when used in combination with other devices or placed in series on short blocks.
- Requires curbside parking prohibition within 30 feet of circle.
- At slow speeds, buses can maneuver around traffic circles.
- Not used at 4-way stop intersections
- Installed with vertical curb

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
Yes	Yes	Possible	No	Yes	No	Yes	Yes

Objective: To reduce vehicle speed by requires drivers to slow down to maneuver around the circle.

Cost: $25,000 to $75,000 each depending on island treatment.

MEDIAN BARRIERS

Step 2

Description: Median barriers are raised islands that prevent certain movements at an intersection.

Advantages:

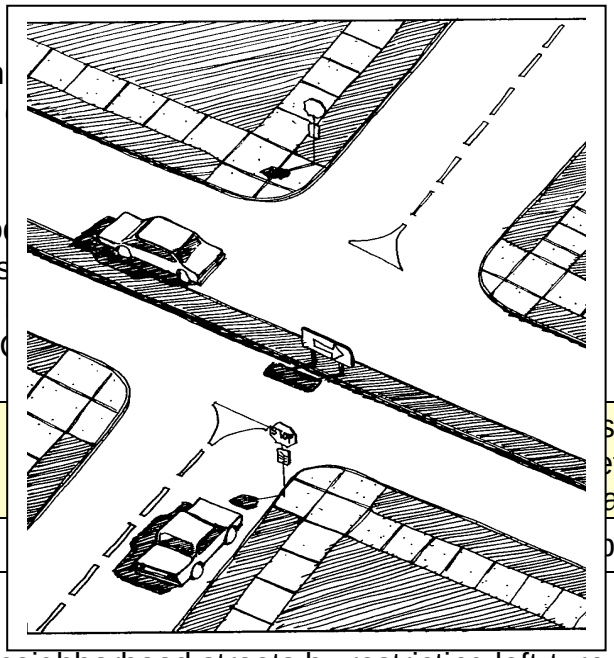
- Reduces cut-through traffic.
- Opportunity for landscaping.
- Provides refuge area for pedestrians.
- Improves intersection safety.
- Provides location for placement of visible signs.

Disadvantages:

- Impedes emergency response times.
- May divert traffic to other neighborhood streets.
- High installation costs.
- Creates obstacle for motorists.

Special Considerations:

- Restricts full access to and from neigh
- May become obstacle for motorists to
- More permanent measure.
- Difficult to alter or remove.
- May divert traffic to other neighborhoo
- Can result in increased emergency res
- Possibility for varied designs, such as
- Requires environmental assessment,



Reduces Speed	Improves Safety	Reduces Volume	Increases Noise		ses et ance
Possible	Possible	Yes	No		ble

Objective: To reduce cut-through traffic on neighborhood streets by restricting left-turn movements. .

Cost: Varies depending on length - $5,000 to $30,000

ONE-WAY STREET CONVERSIONS

Step 2

Description: This action converts a two-way street to one-way operations.

Advantages:

Disadvantages:

- Reduces cut-through traffic.
- Improves safety.
- Redirects traffic to other streets.
- Can encourage increased speeds.
- Increases trip lengths.
- Requires additional signage.
- Redirects traffic to other streets.

Special Considerations:

- One-way street conversions are usually used in combination with other one-way street conversions.
- Affects to bicycles.
- Residential access should be considered in conversions.
- Only requires signage and pavement marking to implement.
- Emergency vehicles can bypass one-way streets.
- Requires environmental assessment, CEQA compliance.

Reduces Speed	Improves Safety	Reduces Volume	Increases Noise	Parking Loss	Restricts Access	Impacts Emergency Response	Increases Street Maintenance
No	Possible	Possible	No	No	Yes	No	No

Objective: To reduce cut-through traffic on neighborhood streets.

Cost: Varies depending on length on street - $5,000 to $10,000.