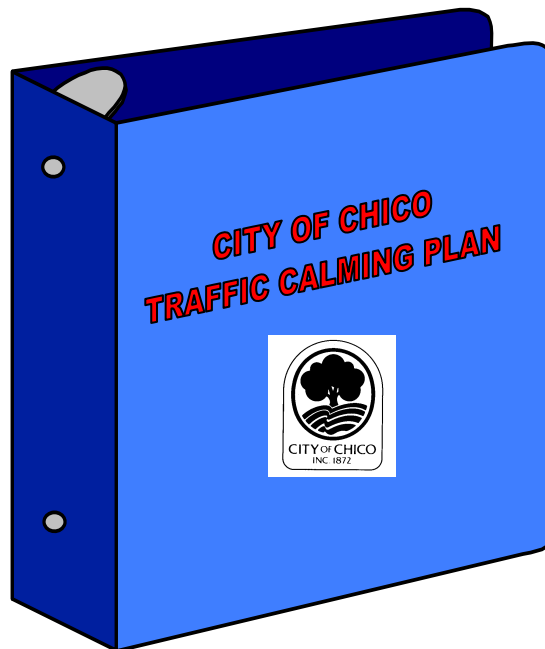




City of Chico

Neighborhood Traffic Management Program



Preserving

Neighborhoods

Chico's

by

Taking traffic concerns into your hands!

City of Chico

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Neighborhood Traffic Management Program

INTRODUCTION

Preserving Chico's Neighborhoods

Take traffic concerns into your hands!

The City of Chico Department of Public Works is taking action to address neighborhood traffic concerns through a community-based program called the Neighborhood Traffic Management Program (NTMP). The NTMP is a comprehensive program, which provides you and your neighbors with a process with which to address neighborhood traffic concerns (traffic speed and volume) on both collector and local streets.

The goal of the NTMP is to calm traffic by altering motorist behavior on a street or on a street network by using the three "E"s, traffic education, enforcement, and engineering in the interest of street safety, livability, and other public purposes as set forth in the Transportation Element of the City of Chico General Plan.

T-G-20 *Reinforce the role of the street as a public space which organizes the city and provides corridors for the movement of transit, bicycles and pedestrian as well as autos.*

T-I-51 *Discourage speeding and "cut-through" traffic on local neighborhood streets by installing appropriate traffic control devices, such as bulbup and narrower street widths.*

How the NTMP Works

You, your neighbors, and Public Works staff will work together in partnership to establish neighborhood traffic calming goals and develop a traffic calming plan. Initially, the program focuses on less restrictive measures such as signing and markings. Traffic safety education and police enforcement are emphasized. However, if traffic concerns persist, consideration may be given to speed and volume control measures *which may require a financial commitment from the neighborhood to implement the traffic calming plan.*

The Three "E"s of the NTMP:

Education - Guided by Public Works staff, you and your neighbors will receive the information and the tools necessary to make informed decisions regarding traffic concerns in your neighborhood.

Enforcement - Strategies identified by your neighborhood will be supported by police and parking enforcement.

Engineering - Through this partnership, traffic calming strategies will be considered based upon engineering principles and community input.

Teaming Up for a Better Neighborhood

This program requires a commitment from both you and your neighbors. To begin the process, Community Action Request (CAR) form (see Community Action Request Form - Parts 1 & 2) must be completed and returned to the City.

GETTING STARTED

- Step 1** Neighborhood completes and returns a Community Action Request (CAR) form to the City (Pages 6 - 8).
- Step 2** Public Works staff reviews the CAR form for completeness and determines the appropriate street classification (Appendix D, Page 49).
- Step 3** Staff will determine appropriate traffic calming boundaries for the neighborhood based upon the initial neighborhood input (CAR form) and review to ensure that all affected areas are included.
- Step 4** Public Works staff contacts neighborhood residents to schedule an initial meeting, the Program Kick-Off Meeting.
- Step 5** Public Works staff presents the Neighborhood Traffic Management Program for the specific street classification determined from the CAR form at the Program Kick-Off Meeting.
- | | |
|--------------------------|---------------|
| Local Street Program | Pages 9 - 15 |
| Collector Street Program | Pages 16 - 20 |
- Step 6** A traffic calming plan will be developed following NTMP guidelines.
- Step 7** The traffic calming plan will then be presented to the neighborhood. Residents will be surveyed to determine neighborhood support. The traffic calming plan must be supported by the residents in order for the plan to proceed.
- Step 8** The traffic calming plan will then be presented to the City Council for approval.
- Step 9** Funding for the approved traffic calming plan will be determined by the City Council and *may require a financial commitment from the neighborhood to implement the traffic calming plan.*

Community Action Request Form - Part 1

Parts 1 and 2 must both be completed before submitting to Public Works.

Contact Name: _____

Day/Message Phone: _____

Address: _____

Today's Date: _____

=====

Please indicate traffic issues that concern residents in your neighborhood.

- | | |
|------------------------|-------------------------|
| _____ speeding | _____ increased traffic |
| _____ bicyclist safety | _____ pedestrian safety |
| _____ pet safety | _____ collisions |
| _____ other | |

If you selected "other," please explain:

=====

Please describe the boundaries of your neighborhood:

Are you aware of any neighborhood associations that represent your area?

The following petition must be completed prior to submitting the CAR form. Each of the residents signing this petition must be at least 18 years of age and must reside in separate households within the neighborhood boundaries described.

By signing, the residents listed below are requesting that this neighborhood be considered in the Neighborhood Traffic Management Program.

	Signature	Printed Name	Address	Phone Number (Optional)
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

Community Action Request Form - Part 2

Thank you for your interest in the Neighborhood Traffic Management Program. Based upon the date the CAR form is received by Public Works, neighborhood requests will be processed on a first come, first served basis. You will be contacted once the CAR form is received and initially processed.

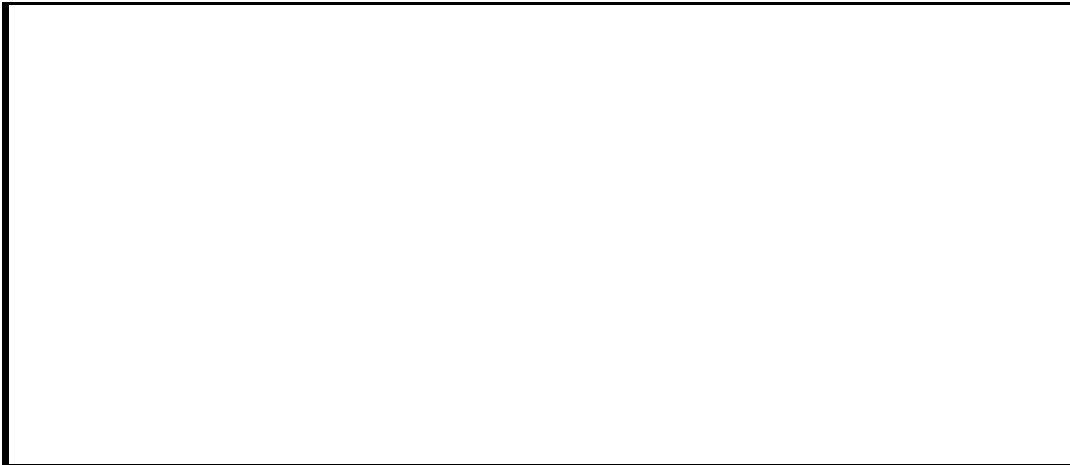
Please submit completed forms Parts 1 and 2 to:

City of Chico, Department of Public Works
Neighborhood Traffic Management Program
411 Main Street
PO Box 3420
Chico, CA 95927
(530) 879-6941
FAX (530) 895-4899

Please draw or attach a street diagram that includes the boundaries of your neighborhood.

If you would like to use a City Parcel Map click here

<http://chico.facilitiesmap.com/index.cfm>



LOCAL STREET PROGRAM

What is Traffic Calming

Traffic calming involves altering of motorist behavior on a street or on a street network by using the three “E”s, traffic education, enforcement, and engineering in the interest of street safety, livability, and other public purposes.

NTMP Local Street Objectives

- To improve driver behavior, concentration, and awareness.
- To reduce speeds and traffic volumes.
- To enhance the neighborhood environment.

What is a Local Street?

The City of Chico General Plan defines **Local Streets** as follows: *“The primary function of local streets is to provide direct access to adjacent properties. Local streets should provide two travel lanes, landscaped parkstrips, sidewalks, and on-street parking. On-street parking may be restricted. Bike lanes may not be needed because local streets carry low traffic volumes and all local streets are considered to be bicycle friendly.”*

How do neighborhoods get involved?

To begin the process, each neighborhood must complete a Community Action Request (CAR) form. CAR forms are available through the Department of Public Works or the City Clerk’s Office. The CAR form is also available on the Internet at www.ci.chico.ca.us.

The CAR form includes general information about the program and selection process, a petition, and a section where neighborhood boundaries and traffic concerns can be listed. A minimum of 10 residents, each from a separate household, must sign the petition to qualify the neighborhood for consideration.

Ranking Local Streets

Public Works staff will review all submitted CAR forms for completeness and assign a numerical score based upon the following criteria:

Rank Score

Criteria	Points	Basis for Point Assignment
Speed	0 to 35	85 th Percentage Speed (5 points assigned for every 1 mile per hour over 30 MPH).
Volume	0 to 35	Average daily traffic volumes (5 points assigned for every 250 vehicles over 500 vehicles per day).
Pedestrian Generators	0 to 10	5 points assigned for each public facility (such as park, community center) that generates a significant number of pedestrians on the street.
School	0 to 10	5 points assigned for each 25 mph school zone and an additional 5 points for an elementary school.
Sidewalks	0 or 5	5 points assigned if there are not continuous sidewalk on both sides of the street.
Bicycle Route	0 or 5	5 points assigned if the street is a designated bicycle route.
Total Points Possible	100	

Neighborhoods with a **Rank Score** under 45 will not be eligible for further consideration. The residents will be notified and the CAR form returned. Neighborhoods with a **Rank Score** of 45 or more proceed with the program.

The **Rank Score** will be used later by the City Council to determine the level of funding during budget hearings.

In addition to determining the **Rank Score**, neighborhood boundaries will be established based upon:

- Initial input from neighborhood residents (CAR form) and
- Review by Public Works staff to ensure that all affected areas are included.

Program Kick-Off Meeting

The NTMP for Local Streets will be presented at a kick-off meeting, where staff will be available to answer questions and distribute program materials. Both **Rank Score** and neighborhood boundaries will be discussed, and guidelines for establishing a neighborhood traffic calming committee (TCC) will be reviewed.

Phase I vs. Phase II Measures

In an effort to maintain cost effectiveness, the traffic calming plan for each neighborhood must begin with **Phase I** traffic calming measures (the least restrictive) and gradually increase, if necessary, to **Phase II** traffic calming measures (diversionary).

Developing a Phase I Traffic Calming Plan

A complete list of available Phase I Traffic Calming Measures is included in Appendix A.

Development of a Phase I traffic calming plan will require several meetings as listed below. The exact number of meetings will vary by neighborhood and complexity of issues.

- An initial meeting will be held to form a traffic calming committee (TCC), to identify traffic issues/concerns specific to the neighborhood, and to provide input for Public Works staff who will conduct a field review to check existing conditions and collect traffic data.
- At the second meeting, staff will present a “Neighborhood Traffic Class” for members of the TCC and all other interested parties.
- At the third meeting, staff will present the results and analysis of the traffic data collected as a result of the initial meeting.
- Additional meetings will be held to create a Phase I traffic calming plan by establishing neighborhood traffic calming goals, targeting potential new measures, and organizing neighborhood outreach.

The traffic calming plan will use a combination of **The Three E’s**:

Education - Guided by Public Works staff, you and your neighbors will receive the information and the tools necessary to make informed decisions regarding traffic concerns in your neighborhood.

Enforcement - Strategies identified by your neighborhood will be supported by police and parking enforcement.

Engineering - Through this partnership, traffic calming strategies will be considered based upon engineering principles and community input.

The success of the traffic calming plan is contingent upon compliance with the parameters established by the neighborhood residents.

Phase I traffic calming measures include:

- Neighborhood Traffic Safety Campaign - distribution of educational materials regarding traffic safety issues
- Parking restrictions
- Crosswalks
- Stop signs
- Signage directing traffic (i.e. truck route, mall)
- Bots dots, reflective markings
- Use of radar trailer in neighborhoods
- Targeted police enforcement

More restrictive Phase I traffic calming measures include:

- Pavement Undulations
- Speed Tables
- Raised Crosswalks & Intersections
- Textured Pavements
- Traffic Circles
- Chicane
- Realigned Intersections
- Neckdowns
- Center Islands

- Chokers
- The TCC, with assistance from Public Works staff, develops a Phase I traffic calming plan. The Bicycle Advisory Committee will review the traffic calming plan when applicable.
- Assisted by Public Works staff, the TCC presents the Phase I traffic calming plan to neighborhood residents.

Neighborhood Approval of Phase I Traffic Calming Plan

The neighborhood residents will be surveyed (one ballot per household, unit of multi-family dwelling or apartment complex ((16 or more units)) within the defined neighborhood boundaries. In order for the survey to be considered valid, a minimum of 50 percent of those surveyed must respond by the due date. Of those ballots received, a simple majority in favor of the Phase I traffic calming plan is required in order for the plan to proceed.

- Public Works staff will notify residents of the results of the neighborhood survey.
- The City Council must approve the Phase I traffic calming plan.

If funded,

- The Phase I traffic calming plan will be implemented for a period established by the TCC (a minimum of two months).
- Public Works staff and the TCC will measure the effectiveness of the plan at the end of the pre-established implementation period to determine if neighborhood traffic calming goals have been achieved.
- Assisted by Public Works staff, the TCC will present the outcome of the Phase I traffic calming plan to neighborhood residents.
- If temporary devices are installed, a neighborhood survey is taken to determine whether they should be removed or replaced with permanent control devices.
- Public Works staff will notify residents of the results of the neighborhood survey.
- If approved, the plan for the conversion to permanent devices will go before the City Council for funding approval, and residents will be notified prior to any construction.
- Public Works staff will measure the effectiveness of the plan for up to six months.
- Public Works staff will provide a final report and maintenance plan to residents.

Developing a Phase II Traffic Calming Plan

A complete list of available Phase II Traffic Calming Measures is included in Appendix A.

If, after the implementation of the Phase I traffic calming plan, the neighborhood goals established by the TCC have not been met and Phase II measures might potentially meet those goals, residents may consider Phase II measures. A Phase II traffic calming plan considers traffic diversion measures and will require increased neighborhood support. Before consideration can be given to proceeding with a Phase II traffic calming plan, residents and property owners will be surveyed and a minimum of 50 percent of those must agree to proceed.

Phase II traffic calming measures include:

- Full Closures
- Half Closures
- Semi-Diverter
- Diagonal Diverter
- Median Barriers
- Forced Turn Islands

Development of a Phase II traffic calming plan will require several meetings. The exact number of meetings will vary by neighborhood and complexity of issues.

- An initial meeting will be held to 1) reestablish the traffic calming committee (TCC); 2) meet with Public Works staff to analyze the Phase I traffic calming plan and identify those problems that were not sufficiently addressed under Phase I; and 3) identify potential Phase II measures and provide input to Public Works staff which will assist them in collecting additional traffic data.
- At the second meeting, staff will present the results and analysis of the additional data and check the feasibility of potential Phase II measures.
- Additional meetings will be utilized to create a Phase II traffic calming plan by establishing new neighborhood traffic calming goals, targeting potential new measures, and organizing neighborhood outreach.
- The TCC, with the assistance of Public Works staff, will develop a Phase II traffic calming plan. The Bicycle Advisory Committee will review the traffic calming plan when applicable.
- Assisted by Public Works, the TCC will present the Phase II traffic calming plan to neighborhood residents and property owners.

Neighborhood Approval of Phase II Measures

Phase II measures are designed to divert traffic, thereby altering access to property. The neighborhood residents and property owners will be surveyed (one ballot per household, unit of a multi-family dwelling, or apartment complex ((16 or more units)), and property owners within the neighborhood who are non-residents (one ballot regardless of the number of developed or undeveloped properties) within the defined neighborhood boundaries. In order for the survey to be considered valid, a minimum of 50 percent of those surveyed must respond by the due date. Of those ballots received, two-thirds in favor of the Phase II traffic calming plan is required in order for the plan to proceed. The State of California dictates that the City Council must also approve the Phase II traffic calming plan. According to the California Vehicle Code, restrictive measures such as those proposed by a Phase II plan can only be implemented by ordinance or resolution adopted by the City Council. Additionally, the City Council must approve an environmental review of the traffic calming plan as required by the California Environmental Quality Act (CEQA).

- Public Works staff will notify residents and property owners of the results of the neighborhood survey.
- The City Council must approve the Phase II traffic calming plan.

If funded,

- The Phase II traffic calming plan will be implemented for a period established by the TCC (a minimum of two months).
- Public Works staff and the TCC will measure the effectiveness of the plan at the end of the

pre-established implementation period to determine if neighborhood traffic calming goals have been achieved.

- Assisted by Public Works staff, the TCC will present the outcome of the Phase II traffic calming plan to neighborhood residents and property owners.
- If temporary devices are installed, a neighborhood survey is taken to determine whether they should be removed or replaced with permanent control devices.
- Public Works staff will notify residents and property owners of the neighborhood survey.
- If approved, the plan for the conversion to permanent devices will go before the City Council for funding approval and residents and property owners will be notified prior to any construction.
- Public Works staff will measure the effectiveness of the plan for up to six months.
- Public Works staff will provide a final report and maintenance plan to residents and property owners.

Timeframe

Depending upon the issues and level of community involvement, it could take six to eighteen months to develop a City Council approved traffic calming plan. If funded for construction, neighborhood residents will be provided with recommendations for continued community-based efforts to ensure success.

Funding

Based upon the neighborhood **Rank Score**, the level of funding for the traffic calming plans will be determined by the City Council and *may require a financial commitment from the neighborhood to implement the traffic calming plan.*

COLLECTOR STREET PROGRAM

What is Traffic Calming

Traffic calming involves altering of motorist behavior on a street or on a street network by using the three “E”s, traffic education, enforcement, and engineering in the interest of street safety, livability, and other public purposes.

NTMP Collector Street Objectives

- To improve driver behavior, concentration and awareness.
- To reduce traffic speeds.
- To enhance the neighborhood environment.

What is a Collector Street?

The City of Chico General Plan defines **Collector Streets** as follows: “*Collector streets provide a link between local streets and arterials. Collectors provide two traffic lanes, in addition to any bike lanes*”

where called for in the bikeway plan. In fact, all collectors should be designed to include bicycle lanes. On-street parking may be provided if sufficient width is available. Collectors also provide access to adjacent properties, so driveway access should be discouraged but need not be restricted (subject to accepted engineering practice). Bike lanes, landscaped parkstrips, sidewalks, and transit facilities are also accommodated within the right-of-way.”

How do neighborhoods get involved?

To begin the process, each neighborhood must complete a Community Action Request (CAR) form. CAR forms are available through the City Department of Public Works or the City Clerk’s Office. The CAR form is also available on the Internet at www.ci.chico.ca.us.

The CAR form includes general information about the program and selection process, a petition, and a section where neighborhood boundaries and traffic concerns can be listed. A minimum of 10 residents, each from a separate household, must sign the petition to qualify the neighborhood for consideration.

Eligibility

To be eligible, the collector street must be located primarily in a residential area, with at least 75 percent of the properties fronting streets zoned/existing residential.

Ranking Collector Streets

Public Works staff will review all submitted CAR forms for completeness and assign a numerical score based upon the following criteria:

Rank Score

Criteria	Points	Basis for Point Assignment
Speed	0 to 30	85 th Percentile Speed (3 points assigned for every 1 mile per hour over 30 MPH).
Volume	0 to 30	Average daily traffic volumes (1.5 points assigned for every 100 vehicles over 2,000 vehicles per day).
Residential Density	0 to 10	2.5 points assigned for every 4 fronting residential units per one-quarter of a mile.
Elementary School Crossing	0 to 10	5 points assigned for a 25 MPH school zone and an additional 5 points for an elementary school.
Sidewalks	0 or 5	5 points assigned if there are not continuous sidewalk on both sides of the street.
Pedestrian Generators	0 or 5	5 points assigned if pedestrian generators (retail commercial uses, institutional uses, parks, or other schools) occur along or within 1,000 feet of the street.
Transit Route	0 or 5	5 points assigned if the street is a designated transit route.
Bicycle Route	0 or 5	5 points assigned if the street is a designated bicycle route.
Total Points Possible	100	

Neighborhoods with a **Rank Score** under 45 will not be eligible for further consideration. The residents will be notified and the CAR form returned. Neighborhoods with a **Rank Score** of 45 or more proceed

with the program.

The **Rank Score** will be used later by the City Council to determine level of funding during budget hearings.

In addition to determining the **Rank Score**, neighborhood boundaries will be established based upon:

- Initial input from neighborhood residents (CAR form) and
- Review by Public Works staff to ensure that all affected areas are included.

Program Kick-Off Meeting

The NTMP for Collector Streets will be presented at a kick-off meeting, where staff will be available to answer questions and distribute program materials. Both **Rank Score** and neighborhood boundaries will be discussed, and guidelines for establishing a neighborhood traffic calming committee (TCC) will be reviewed.

Developing a Traffic Calming Plan

A complete list of available Traffic Calming Measures is included in Appendix A.

Because a collector street serves multiple purposes, its use must strike a balance between efficiently moving traffic and preserving neighborhood livability. Since collector streets are meant to serve as through-streets, traffic calming measures are not intended to decrease traffic volumes, so the focus will primarily be on speed control measures.

Development of a traffic calming plan will require several meetings as listed below. The exact number of meetings will vary by neighborhood and complexity of issues.

- An initial meeting will be held to form a traffic calming committee (TCC), to identify traffic issues/concerns specific to the neighborhood, and to provide input for Public Works staff who will conduct a field review to check existing conditions and collect traffic data.
- At the second meeting, staff will present a “Neighborhood Traffic Class” for members of the TCC and all other interested parties.
- At the third meeting, staff will present the results and analysis of the traffic data collected as a result of the initial meeting.
- Additional meetings will be held to create a traffic calming plan by establishing neighborhood traffic calming goals, targeting potential new measures, and organizing neighborhood outreach.

The traffic calming plan will use a combination of **The Three E’s**:

Education - Guided by Public Works staff, you and your neighbors will receive the information and the tools necessary to make informed decisions regarding traffic concerns in your neighborhood.

Enforcement - Strategies identified by your neighborhood will be supported by police and parking enforcement.

Engineering - Through this partnership, traffic calming strategies will be considered based upon engineering principles and community input.

The success of the traffic calming plan is contingent upon compliance with the parameters established by the neighborhood residents.

Traffic calming measures include:

- Neighborhood Traffic Safety Campaign - distribution of educational materials regarding traffic safety issues
- Parking restrictions
- Crosswalks
- Stop signs
- Signage directing traffic (i.e. truck route, mall)
- Bots dots, reflective markings
- Use of radar trailer in neighborhoods
- Targeted police enforcement

More restrictive traffic calming measures include:

- Textured Pavements
- Roundabouts
- Neckdowns
- Center Islands
- Chokers

- The TCC, with assistance from Public Works staff, develops a traffic calming plan. The Bicycle Advisory Committee will review the traffic calming plan when applicable.

- If traffic calming measures are proposed on an emergency response route, the Fire Department must approve the traffic calming plan in order to proceed. Because emergency response routes act as the “response grid” for the Fire Department to provide essential emergency and fire services, traffic calming measures are limited and require Fire Department approval.

- Assisted by Public Works staff, the TCC presents the traffic calming plan to neighborhood residents.

Neighborhood Approval of the Traffic Calming Plan

The neighborhood residents will be surveyed (one ballot per household, unit of multi-family dwelling or apartment complex ((16 or more units)) within the defined neighborhood boundaries. In order for the survey to be considered valid, a minimum of 25 percent of those surveyed must respond by the due date. Of those ballots received, a simple majority in favor of the traffic calming plan is required in order for the plan to proceed.

- Public Works staff will notify residents of the results of the neighborhood survey.

- The City Council must approve the traffic calming plan.

- **If funded,**

- The traffic calming plan will be implemented for a period established by the TCC (a minimum of two months).

- Public Works staff and the TCC will measure the effectiveness of the plan at the end of the pre-established implementation period to determine if neighborhood traffic calming goals have been achieved.

- Assisted by Public Works staff, the TCC will present the outcome of the traffic calming plan to neighborhood residents.
- If temporary devices are installed, a neighborhood survey is taken to determine whether they should be removed or replaced with permanent control devices.
- Public Works staff will notify residents of the results of the neighborhood survey.
- If approved, the plan for the conversion to permanent devices will go before the City Council for funding approval, and residents will be notified prior to any construction.
- Public Works staff will measure the effectiveness of the plan for up to six months.
- Public Works staff will provide a final report and maintenance plan to residents.

Time frame

Depending upon the issues and level of community involvement, it could take six to eighteen months to develop a City Council approved traffic calming plan. If funded for construction, neighborhood residents will be provided with recommendations for continued community-based efforts to ensure success.

Funding

Based upon the neighborhood **Rank Score**, the level of funding of traffic calming plans will be determined by the City Council and *may require a financial commitment from the neighborhood to implement the traffic calming plan.*

Appendix A

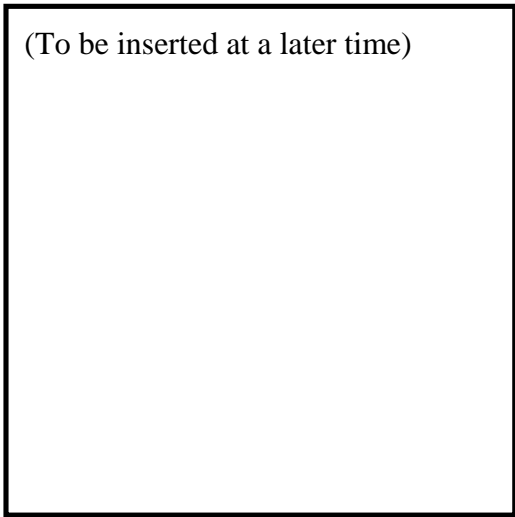
Traffic Calming Measures

Tool	Page	Vehicle Volume	Vehicle Speed	Noise	Vehicle Conflicts	Traffic Diverted	Pedestrian Safety	Bicycle Safety	Emergency Vehicle Access	Appropriate for Use on:
Signing and Markings										L, C
Pavement Undulations		▼	▼	▲	-	-	▲	-	▼	L
Speed Tables		▼	▼	▲	-	-	▲	-	▼	L
Raised Crosswalks		▼	▼	▲	-	-	▲	▲	▼	L
Raised Intersections		-	▼	▲	▼	-	▲	▲	▼	L
Textured Pavements		-	▼	▲	-	-	-	-	-	L, C
Traffic Circle		-	▼	▼	▼	-	▲	▲	-	L
Roundabouts		-	▼	▼	▼	-	▲	▲	-	C
Chicane		▼	▼	▼	▼	▲	-	▼	▼	L
Realigned Intersections		-	▼	-	▼	-	-	-	▼	L
Neckdowns		-	▼	-	-	-	▲	-	-	L, C
Center Island		-	▼	▼	▼	▲	▲	-	▼	L, C
Chokers		-	▼	▼	-	-	▲	▲	-	L, C
Full Closures		▼	▼	▼	▼	▲	Maintain Access	Maintain Access	Maintain Access	L
Half Closures		▼	-	▼	▼	▲	▲	▲	▼	L
Semi-Diverters		▼	▼	▼	▼	▲	▲	▲	▼	L
Diagonal Diverters		▼	▼	▼	▼	▲	▲	▲	▼	L
Median Barriers		▼	-	-	▼	▲	▲	▲	▼	L
Forced Turn Islands		▼	▼	▼	▼	▲	▲	▲	▼	L

▲ use will generally increase the condition ▼ use will generally decrease the condition
 (-) use will generally not affect the condition L: local street C: collector street

TRAFFIC CALMING MEASURES

<u>Traffic Calming Measure</u>	<u>Local Phase I</u>	<u>Local Phase II</u>	<u>Collector</u>
Sianina and Markinas	X	X	X
Speed Control Measures			
Vertical Measures			
Pavement Undulation	X		
Speed Table	X		
Raised Crosswalk	X		
Raised Intersection	X		
Textured Pavement	X		X
Horizontal Measures			
Traffic Circle	X		
Roundabout			X
Chicane	X		
Realigned Intersection	X		
Narrowinas			
Neckdown	X		X
Center Island	X		X
Choker	X		X
Volume Control Measures			
Full Closure		X	
Half Closure		X	
Semi-Diverter		X	
Diaconal Diverter		X	
Median Barrier		X	
Forced Turn Island		X	



SIGNS AND MARKINGS

Traffic signs and markings provide information to motorists, pedestrians and bicyclists. Some traffic signs orient people to where they are or need to go. Other signs alert motorists such as stop signs or speed limit signs. Traffic markings include all painted lines and words, reflectors and other devices applied to the pavement or curb.

Examples: Parking restrictions, crosswalks, stop signs, signage directing traffic (i.e. truck route, mall), bots dots, reflective markings.

Used for:

· To warn motorists of impending conditions that may not be readily apparent.

Considerations:

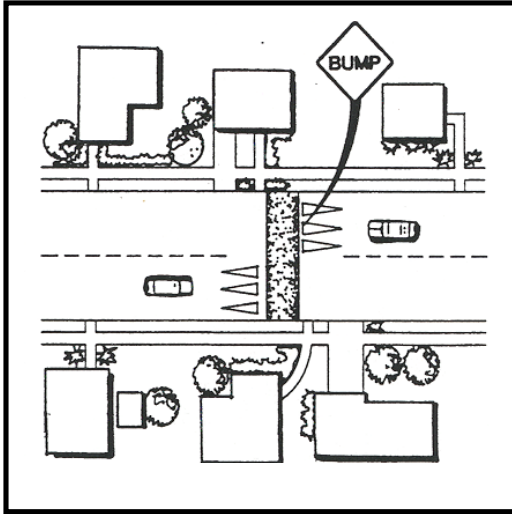
- The *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)* sets the standard for signing and marking in the United States. Published by the Federal Highway Administration, "The *MUTCD* is used day to day in the courts of this land to argue about the safety of particular highway locations with reference to whether appropriate traffic control devices were present or needed."
- The MUTCD offers a degree of flexibility in the application of signs and markings. It states, for example:

Engineering judgement is essential to the proper use of signs, the same as with other traffic control devices. Traffic engineering studies may indicate signs would be unnecessary at certain locations.

Care should be taken not to install too many signs. A conservative use of regulatory and warning signs, if used to excess, tend to lose their effectiveness.

Cost:

- The cost of signs and marking vary depending on number and type.



PAVEMENT UNDULATION

City of Chico pavement undulations (speed bumps) are 3 inches in height, 12 feet in width and extend the full width of the street. The vertical deflection is intended to reduce vehicle speed. Although popular, pavement undulations have some negative aspects. They delay emergency vehicle response times by 9-15 seconds, create noise and potentially shift the speed problem to a parallel adjacent street. Often they have minimal impact on the worst drivers, while punishing the most responsible motorists.

Used for:

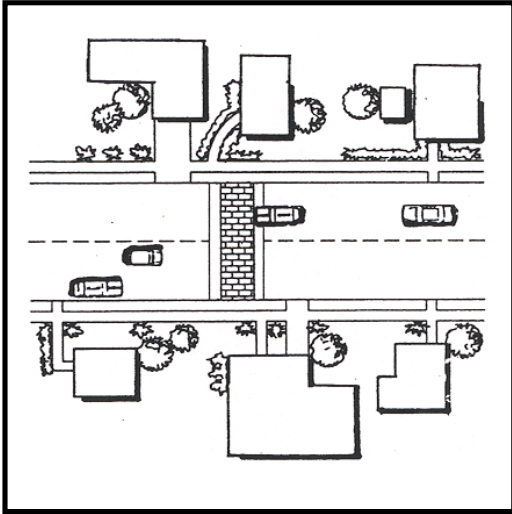
- Traffic calming narrow streets where few other measures can be applied.
- Used in series to reduce speeds along a length of street.
- To slightly decrease cut-through traffic volumes by shifting traffic to arterials.

Considerations:

- Has minimal effect on trucks and sport utility vehicles and may worsen speeding with problem drivers.
- Use when problems are very localized and can be controlled with a single measure.
- Care should be taken not to install too many undulations and divert traffic to neighboring streets.
- May make a neighborhood appear to be a “problem area.”
- Can not be used on emergency response routes.
- Often found by adjacent neighbors to be noisy.
- Drivers may speed up between undulations.
- Signage may be considered unsightly by adjacent neighbors.
- Can be used in conjunction with other traffic calming measures.

Cost:

- The cost of a single pavement undulation with appropriate signage is \$6,000.



SPEED TABLE

A speed table is defined as a flat-topped speed hump typically long enough for the entire wheelbase of a passenger car to rest on top. The most common type of speed table is 3 to 4 inches in height and 22 feet in length in the direction of travel, with a 6-foot long ramp at each end and a 10-foot flat surface on top. It has an 85th percentile speed of 25 to 30 mph which give speed tables higher design speeds and is less jarring than the standard 12-foot pavement undulations.

Used for:

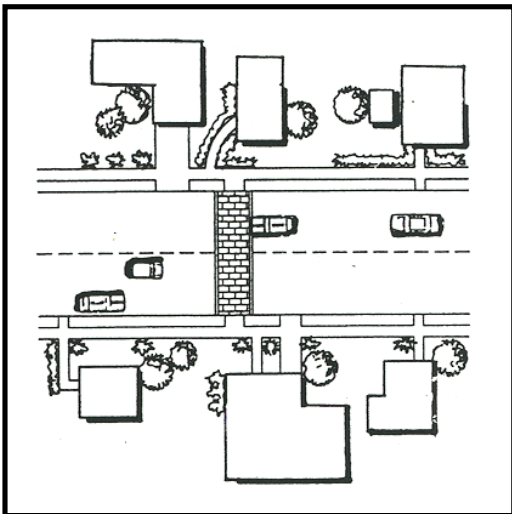
- The long flat tops, plus ramps that are sometimes more gently sloped than pavement undulations.
- Reducing speeds where crosswalks are on local residential streets.

Considerations:

- Has minimal effect on trucks and sport utility vehicles and may worsen speeding with problem drivers.
- May make a neighborhood appear to be a “problem area.”
- Use when problems are very localized and can be controlled with a single measure.
- Often found by adjacent neighbors to be noisy.
- Can be used in conjunction with other measures.
- May be too gentle to solve certain speeding problems.
- Can not be used on emergency response routes.
- The aesthetics can be improved through the use of color and specialized paving materials.

Cost:

- The cost of a speed table for a mid-block location is \$21,000.



RAISED CROSSWALK

Raised crosswalks are essentially a flat-topped pavement undulation (speed table) marked for pedestrian crossings.

Used for:

- Enhancing pedestrian and bicyclist crossings, particularly at un-signalized crossing.

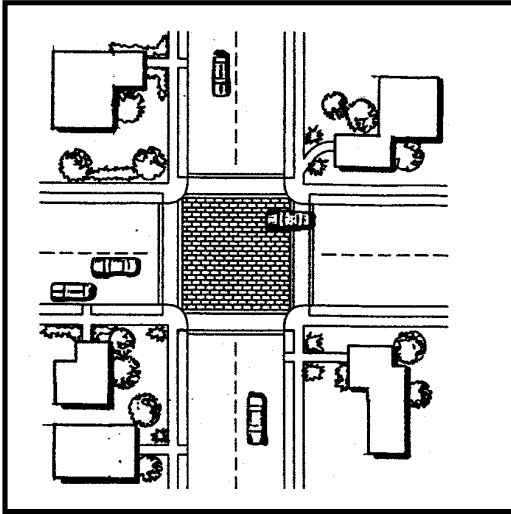
- Establishing “Safe Routes To School” crossings.

Considerations:

- Has minimal effect on trucks and sport utility vehicles and may worsen speeding with problem drivers.
- Most critical on roadways with high speeds and high traffic volumes.
- May make a location appear to be a “problem area.”
- Use when problems are very localized and can be controlled with a single measure.
- Often found by adjacent neighbors to be noisy
- Can be used in conjunction with other measures.
- Can not be used on emergency response routes.

Cost:

- The cost of a raised crosswalk with appropriate signage and markings is \$21,000.



RAISED INTERSECTION

A raised intersection involves providing ramps on each of the intersection approaches and elevating the entire intersection by approximately 6 inches. The crosswalk on each approach are also elevated as a part of this treatment. Bollards are sometimes added to reduce the likelihood of drivers cutting through the intersection on the sidewalk. The intersection ramps are usually made of concrete, but may be constructed of paving stones, bricks or other materials. As with other vertical treatments such as pavement undulations or speed tables, these devices are uncomfortable for buses.

Used for:

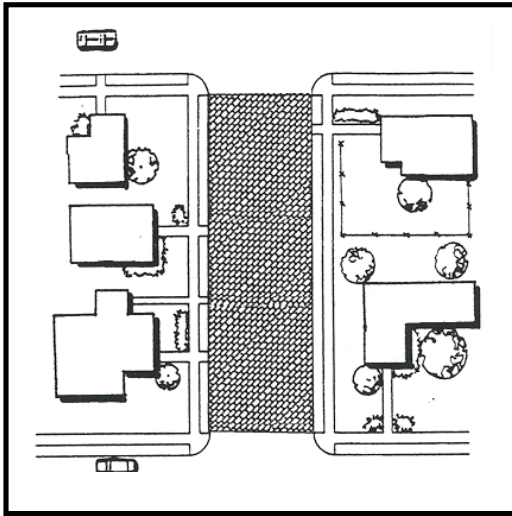
- Reducing conflict speed at most critical location.
- Improving pedestrian and bicycle access and safety at most critical location.
- Locations with high pedestrian volumes with significant safety concerns related to traffic speeds.
- Creating a prime corner ("100% corner") and increasing public amenities.

Considerations:

- Requires good sight distances, and cannot be used effectively on steep grades.
- Must coordinate design with transit, and other major operators.
- If cost is prohibitive, consider speed tables or raised crosswalks as alternatives.
- May increase values of adjacent residential and commercial properties.
- Can not be used on emergency response routes.

Cost:

- The cost of a raised intersection with appropriate signage and markings is \$70,000.



TEXTURED PAVEMENT

Textured pavements are roadway surfaces paved with brick, concrete pavers, stamped asphalt, or other surface materials that produce constant small changes in vertical alignment.

Used for:

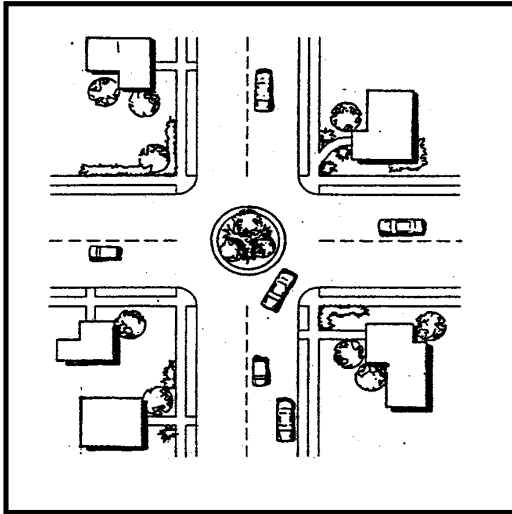
- Enhancing the street environment and improving property values by improved aesthetics.
- Projecting an image that the street is part of a place rather than a through route.
- Enhancing all other types of traffic calming measures.
- Increasing neighborhood pride, ownership and commitment to work together.

Considerations:

- May present difficulties for pedestrians and bicycles, particularly in wet conditions.

Cost:

- The cost of textured pavements is \$20 per square foot.



TRAFFIC CIRCLE

Traffic circles are raised circular islands constructed in the center of local residential street intersections to reduce vehicle speed. Drivers making left turns are directed to maneuver in a counter-clockwise direction, exiting the traffic circle by turning right onto the desired street. Signs are often installed within the circle to direct motorists to proceed to the right of the circle before passing through or making a left turn. They can be constructed with landscaping. Stop signs are removed and yield control is used on all four approaches. Traffic circles often improve emergency response times up to 30% when four-way stop controls are removed.

Used for:

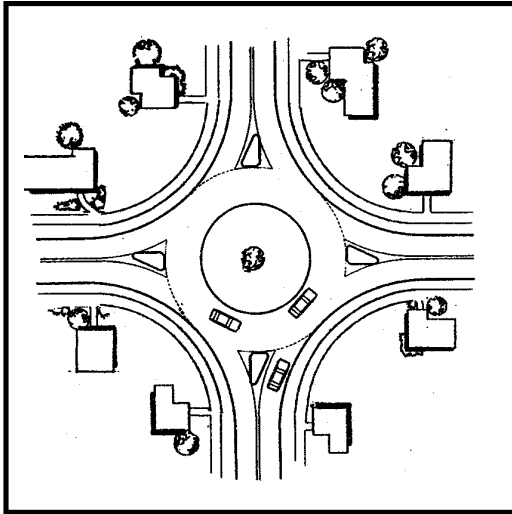
- Managing traffic at an intersection where volumes do not warrant either a stop control or traffic signal.
- Reducing crashes at intersections of two local streets.
- Reducing vehicle speeding at the intersection.
- Treating a series of intersections along a local street as part of a neighborhood traffic management program.

Considerations:

- Loss of on-street parking.
- Deflection curves must hold motorist speeds to 15-18 mph maximum.
- Pedestrians and bicyclists must adjust to less traditional crossing patterns.
- Improves bicycling and walking conditions.
- Signage and pavement markings associated with traffic circles may not be attractive.
- Larger vehicles (e.g., school buses, fire apparatus) may need to make left turns in front of circle.
- Landscaping that provides contrast, and especially trees, increase the effect of these intersection islands for distances up to 200 feet.
- Keeps motorists in motion, thus creating quieter, cleaner air conditions.
- Do not use if corner parking cannot be effectively controlled. In such settings fire responders may be denied access to a street.

Cost:

- The cost of a traffic circle with appropriate signage is **\$10,000**.



ROUNDBABOUT

A roundabout is a circular, raised island with deflector islands that form a hub for the traffic that flows around it and the streets that shoot off it. Roundabouts are located at the intersection of a collector or arterial street with one or more crossing roadways. Traffic circulates within roundabouts in a counter-clockwise direction and exits the roundabout by turning right onto the desired street. Therefore, no left-turning movements are needed. Unlike a signalized intersection, drivers select gaps in the traffic to enter the roundabout from each approaching street without having to stop. Roundabouts need to be constructed with crossing points and medians to accommodate pedestrians and bicyclists. Crosswalks should be placed one car length beyond the yield line so that drivers exiting the roundabout have a full view of pedestrians. The design should not permit a motorist to

travel faster than 15-20 mph.

Used for:

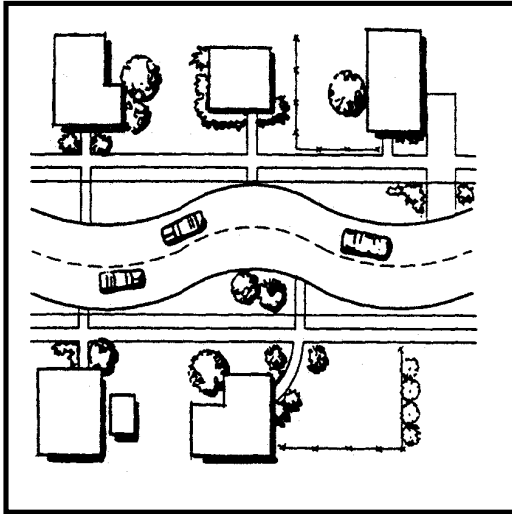
- Managing both vehicle and pedestrian movements where the existing intersection is unusually large and complex.
- Improving an existing signalized or four-cross intersection which is experiencing heavy traffic backup and congestion.
- Improving safety of motorists, pedestrians and bicyclists as well as increasing intersection capacity.
- Creating a gateway into a downtown, neighborhood, or other area.

Considerations:

- Street widths and/or available right-of-way need to be sufficient for a properly designed roundabout. Generally, all size vehicles and turning movements are supported with 110 feet from two diagonal corners. Smaller spaces can accommodate a roundabout, especially if the design vehicle or certain turns are restricted.
- Vehicle deflection must be set to reduce speed to 15-18 mph, larger deflections create safety problems for all users.
- Use splitter islands entering and exiting roundabout to control deflection and turning movements.

Cost:

- The cost of a roundabout with appropriate signage and markings is \$105,000.



CHICANE

Chicanes usually consist of a series of bulbouts or curb extensions that narrow the street to one lane at selected points and force motorists to slow down to maneuver between them. Such treatments are intended for use only on local residential streets or quiet portions of a downtown with low traffic volumes (under 1,500 vehicles per day), where it is desirable to greatly restrict vehicle speeds and movements.

Used for:

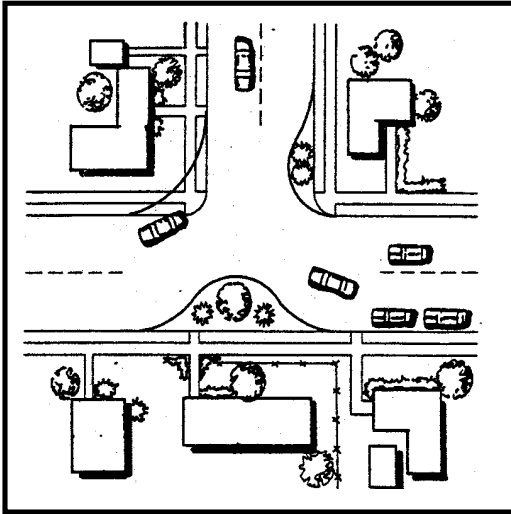
- Reducing vehicle speeds on long blocks (over 500 feet).
- Adding greenery and visually narrowing appearance of street.
- Creating a park-like environment
- Assuring 20-foot opening for fire truck operations.

Considerations:

- Properly designed and planted, chicanes create appearance that street ends mid-block. This further reduces speeding, and can reduce volumes on some streets.
- Can be used with or without existing curbing. In many cases drainage can flow along existing curb line, but can create new maintenance problems.
- Increased maintenance for landscaping and pavement.
- Significant loss of on-street parking.
- Most residents would have driveways affected by this type of installation.

Cost:

- The cost of a chicane with appropriate signage and markings vary between \$19,000 and \$118,000.



REALIGNED INTERSECTION

This design treatment is intended for certain T-intersections in residential areas where the speeds of through traffic need to be reduced. It involves a gradual curb extension or bulb at the top of the T so that vehicles are deflected slightly as they pass straight through the intersection. This type of design helps to discourage cut-through traffic in a neighborhood. Careful design for each site is required to ensure that the deflection slows drivers but does not cause confusion about permitted movements.

Used for:

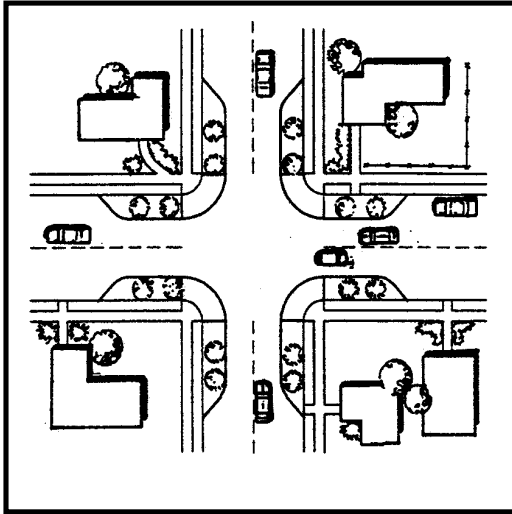
- Reducing vehicle speeds through a T-intersection on a residential street.
- One of a few traffic calming measures for T-intersections.
- Narrowing field of vision (with well-landscaped median islands and curb extension).
- Simplifying street crossings for pedestrians and bicyclists.

Considerations:

- Used when vehicle volumes are low to moderate and intended to provide primarily for local traffic.
- Works best for low to moderate traffic volumes (up to 1,200 ADT).
- Does not provide as many safety benefits as a traffic circle.
- Results in the loss of on-street parking.
- Most residents would have driveways affected by this type of installation.

Cost:

- The cost of a realigned intersection is \$43,000.



NECKDOWN

Neckdowns extend the sidewalk or curb line into the street, reducing the street pavement width. They calm traffic speeds and improve pedestrian crossings. They shorten crossing distances and reduce the time pedestrians are exposed to traffic. Neckdowns improve visibility for both pedestrians and motorists and discourage motorists from parking in a crosswalk or from blocking a curb ramp. Motorists may travel more slowly at intersections with neckdowns depending upon how narrow the roadway becomes. Used in sequence, especially with landscaping, neckdowns tighten overly wide streets. The more restricted the street width becomes, the slower motorists tend to travel.

Used for:

- Slowing vehicles at the entry-point of the street.
- Improving safety for pedestrians and motorists at intersections; increases visibility and reduces speed of turning motor vehicles.
- Increasing visibility and reducing speed of turning motor vehicles at intersections.
- Improving mid-block visibility of pedestrians by bringing them to the edge of parked vehicles.
- Encouraging pedestrians to cross at designated locations.
- Preventing motorists from parking at corners.
- Improving access for emergency responders and large vehicles to narrow streets that might be blocked by on-street parking.
- Providing opportunity for high quality ramps for people with disabilities.
- Providing location for landscaping and public amenities.
- Reduce turning speeds at intersections.

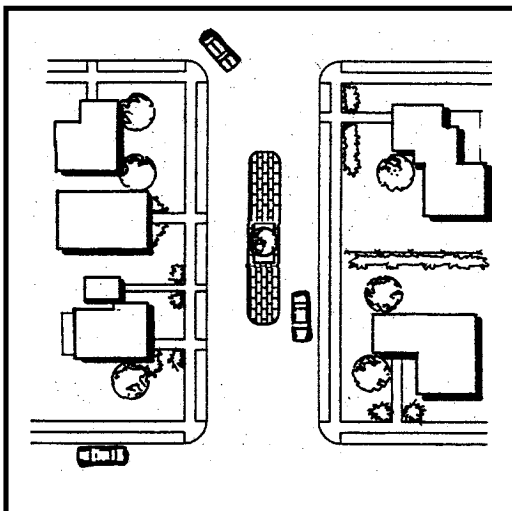
Considerations:

- Loss of on-street parking.
- When bike lanes are included, principal street curb extensions are adapted to permit a bike lane.

Cost:

- The cost of a neckdown is \$46,000.

CENTER ISLAND



A center island may be considered to be a long pedestrian refuge island which is raised and located near the center portion of the street. They provide refuge for pedestrians and bicyclists who cross a street mid-block or at intersections. Adding center islands to existing streets may require reducing lane widths, the number of lanes, and/or removing on-street parking. Center islands can be designed with turning pockets at intersections or at restricted locations. Typically, safety is enhanced due to a reduction in vehicle speed and an increase in separation between opposing directions of traffic and a reduction in points of conflict where turns are allowed.

Used for:

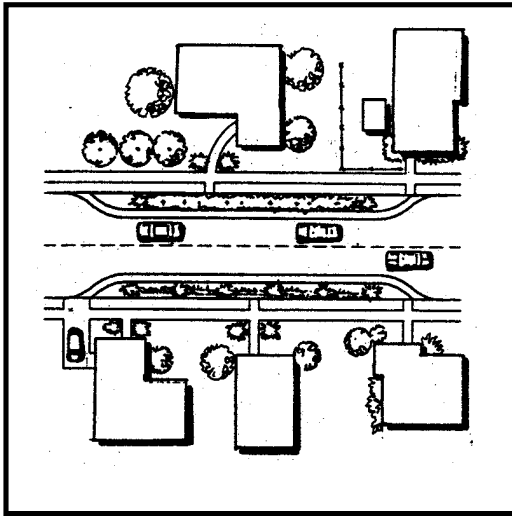
- Managing motor vehicle traffic, providing comfortable left-hand turning pockets with fewer lanes or narrow lanes, and improving access to some properties.
- Improving access across streets in commercial, park and transit districts or corridors.
- Providing a refuge for pedestrians and bicyclists crossing the street.
- Providing space for street trees and other landscaping opportunities to increase community pride and sense of place.

Considerations:

- Most critical on high-volume, high-speed collectors and arterials.
- Will often increase property values.
- Can double the safety of roadway by reducing conflicts.
- Use small islands or pedestrian islands if cost or driveway access is an issue.
- Conversion of former wide streets may allow for bike lanes, wider sidewalks, green planter strips and other measures that temper inappropriate driving speed on main roads.
- If full center islands are used, some driveways can only be accessed with U-turn or other turn option. Most business and residential property owners must understand the benefits and disadvantages.
- Results in the loss of on-street parking.
- Most residents would have driveways affected by this type of installation.

Cost:

- The cost of a center island is \$170 per lineal foot.



CHOKER

Chokers can be achieved in two different ways. The lane width can be reduced, with excess asphalt then striped with a bicycle lane or pave shoulders. These treatments make the driving area appear to be narrow without adding curbing to physically narrow the roadway. The street can also be physically narrowed by extending sidewalks, providing landscaped areas, or adding on-street parking within the former curb lines. This often reduces vehicle speeds along a roadway section and enhances movement and safety for pedestrians. Adding bicycle lanes on higher-volume streets with speeds in excess of 20 mph enhances bicycle travel by increasing the predictability of both car and bicycle movements. Such treatments are particularly desirable for a neighborhood when several streets are treated in this way to create a connected system of bike lanes.

Used for:

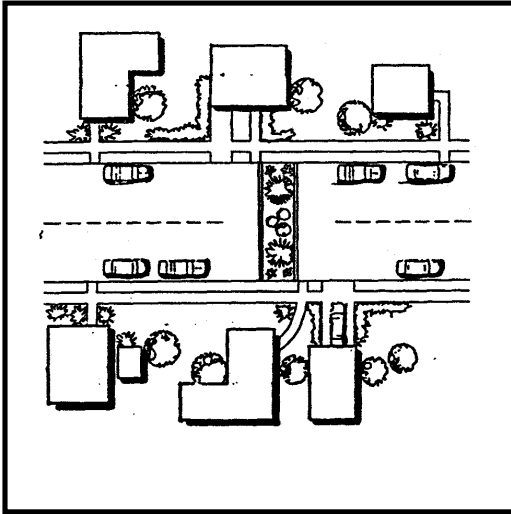
- Reducing speeds, increasing safety and redistributing space to other users and uses.

Considerations:

- Bicyclists must be safely accommodated. Bike lanes are needed if motor vehicle speeds exceed 20-25 mph. If speeds are less than 20-25 mph, bikes and motor vehicles can share the same space on the roadway. The extra width, in such settings, is often beneficial to pedestrians or dedicated for other neighborhood needs.
- Use of bike lanes helps with truck turning movements (larger effective turning radius) and creates a space to allow motorists to pull over for emergencies and emergency responders.
- Results in the loss of on-street parking.
- Most residents would have driveways affected by this type of installation.
- Potential obstacle for motorists to run into.

Cost:

- The cost of a choker is \$35,000.



FULL CLOSURE

A full closure is accomplished by installing a physical barrier that blocks a street to motor vehicle traffic either in initial design (e.g., new cul-de-sac) or by closure of an existing street. A full closure is done on a local street to prevent through traffic, but allows access for pedestrians (including wheelchair users), bicyclists and emergency responders. Full closures typically shift traffic to other neighborhood streets and should only be considered if no other treatment will work. It is important to approach traffic calming from a neighborhood-wide perspective. Often other tools, such as an intersection median barrier, will address the cut-through problem without such severe ripple effects.

Used for:

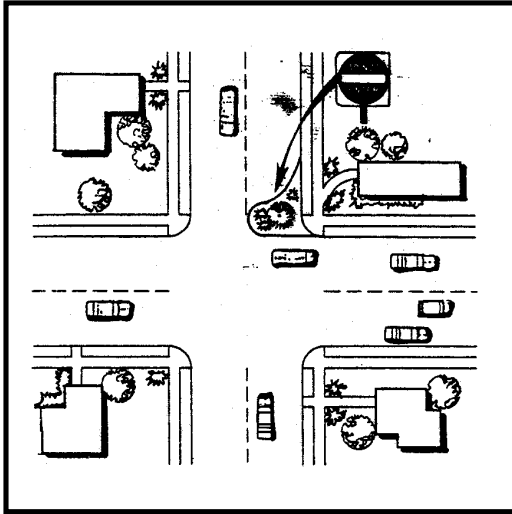
- Very effective at eliminating most of the previously speeding traffic on a block.
- Very effective at reducing volumes.
- Limiting motor vehicle traffic to certain areas.
- Creating a short pedestrian mall.
- Creating a park, public plaza or other public space.
- Establishing an overall traffic management strategy.

Considerations:

- Has highest negative impact on local residents.
- Highly restrictive. Analyze if new traffic patterns will adversely affect other streets in a negative manner. May generate new auto trips.
- Requires attention to turning movements of vehicles at street end.
- Design should allow walking, bicycling, and access for people with disabilities, emergency responders, transit and school buses. Use only if non-motorized access is improved to key locations.

Cost:

- The cost of a full closure is \$7,000.



HALF CLOSURE

A half street closure blocks one direction of motor vehicle travel into or out of an intersection. It can also block one direction of travel on a two-way street. A half closure can be one-way, but are often two-way. If one way, then they should be marked with signs such as DO NOT ENTER, NO LEFT TURN or NO RIGHT TURN. A half closure impacts adjacent streets, therefore, it is important to include neighbors in the planning process. They should be designed to allow easy access by bicyclists and pedestrians.

Used for:

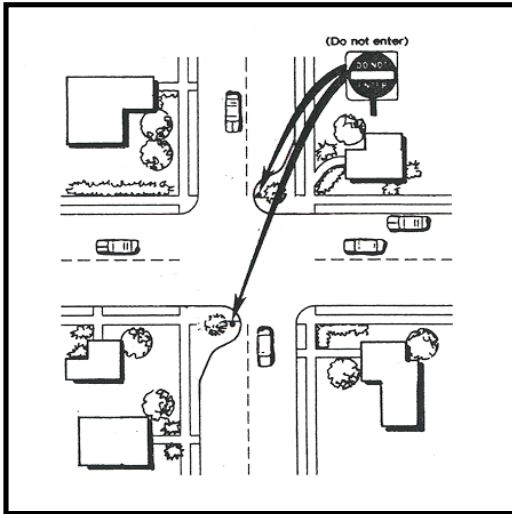
- Preventing turns from an arterial street onto a residential street.
- Reducing the use of the street as a cut-through route.
- Restricting access to a street without creating one-way streets.
- Creating a pocket park and enhancing the neighborhood.

Considerations:

- Analyze whether less restrictive measures would adequately solve the problem.
- Analyze whether other adjacent local streets will be adversely affected.
- May be an option to a full street closure.
- Can increase distance that residents may need to travel and put additional traffic on the other streets.
- Should be designed to allow emergency, bicycle and pedestrian access.
- Could be violated, especially in the late evening.

Cost:

- The cost of a half closure is \$20,000.



SEMI-DIVERTER

A diverter consists of an island or curbed closure which prevents certain through and/or turning movements at intersections of residential streets. A semi-diverter is the result of two half closures placed across from one another.

Used for:

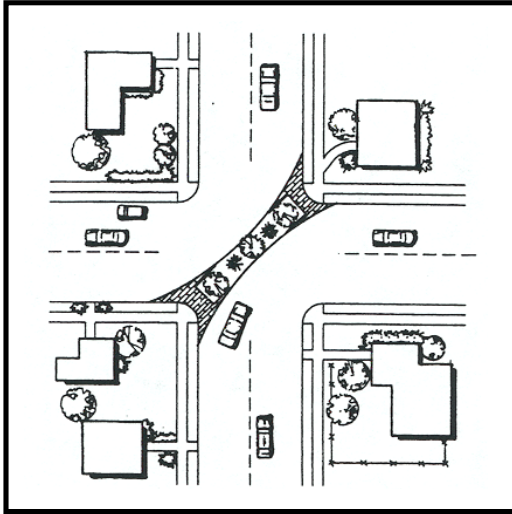
- Traffic volume control.
- Discouraging commuter or other inappropriate traffic from entering or cutting through a neighborhood.
- Creating part of a bicycle boulevard system.
- Creating a small pocket park.

Considerations:

- Diverters are a very strong measure and will have negative impacts on residents who use the street daily.
- Consider less restrictive measures first.
- Try to solve main corridor problem first. Will an intersection improvement curtail cut-through traffic?
- Diverters should have strong neighborhood support before they are installed.
- Used most effectively on grid streets, or other patterns where many linkages exist.
- Evaluate neighborhood traffic patterns to determine whether other streets and emergency operations, sanitation, school bus and transit would be adversely affected.
- It is often possible to build a diverter to permit emergency response and bus access.
- Design diverters with ramps to allow bicycle and ADA access.

Cost:

- The cost a semi-diverter is \$37,000.



DIAGONAL DIVERTER

A diverter consists of an island or curbed closure which prevents certain through and/or turning movements at intersections of residential streets. A diagonal diverter breaks up cut through movements and forces right or left turns in certain directions. As with other traffic calming measures, diagonal diverters must be used in conjunction with other traffic calming measures within the neighborhood street network. A diagonal diverter should be designed to allow pedestrian, bicycle and emergency access.

Used for:

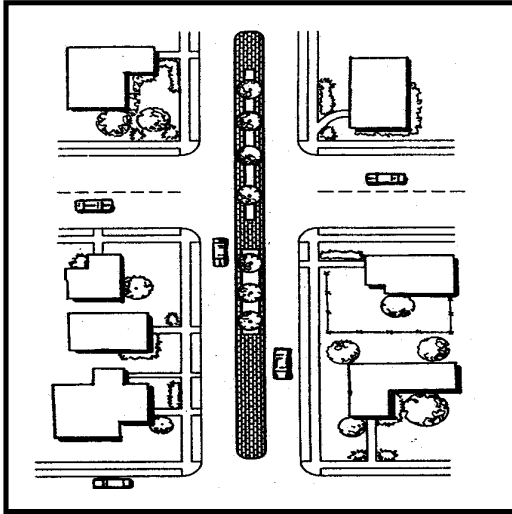
- Traffic volume control.
- Discouraging commuter or other inappropriate traffic from entering or cutting through a neighborhood.
- Creating part of a bicycle boulevard system.
- Creating a small pocket park.

Considerations:

- Diverters are a very strong measure and will have negative impacts on residents who use the street daily.
- Consider less restrictive measures first.
- Try to solve main corridor problem first. Will an intersection improvement curtail cut-through traffic?
- Diverters should have strong neighborhood support before they are installed.
- Used most effectively on grid streets, or other patterns where many linkages exist.
- Evaluate neighborhood traffic patterns to determine whether other streets and emergency operations, sanitation, school bus and transit would be adversely affected.
- It is often possible to build a diverter to permit emergency response and bus access.
- Design diverters with ramps to allow bicycle and ADA access.

Cost:

- The cost of a diagonal diverter is \$25,000.



MEDIAN BARRIER

This shortened version of a raised center island extends through the intersection a distance adequate to prevent cross-street through movements and left-turning movements to cross streets from the main street. This treatment benefits pedestrians who need to cross any leg of the intersection and restricts vehicle entry into and out of neighborhoods, and can therefore greatly reduce cut-through traffic. The median barrier can be as narrow as 4 feet, but 8 feet is preferred.

Used for:

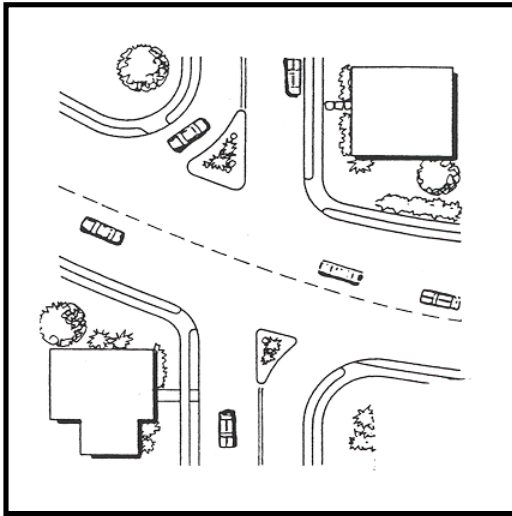
- Reducing cut-through traffic on a neighborhood street.
- Creating bicycle boulevard streets.
- Improving pedestrian access across busy collector and arterial streets.

Considerations:

- Works best with grid pattern or other neighborhoods where there are many points of entry.
- Local residents need to be provided access and should not be required to drive excessive distances to reach their homes.
- Analyze traffic patterns to see how much, if any, traffic will be diverted to other streets.
- Design must include safe and convenient emergency vehicle, bicycle and pedestrian access.
- Can be used internally in a neighborhood, but is more frequently used on edges and entries.
- May improve capacity of principal roadway, thus keeping road to minimal number of lanes.

Cost:

- The cost of a median barrier is \$170 per lineal foot.



FORCED TURN ISLAND

Forced turn islands are raised islands that block certain movements on approaches to an intersection. They are sometimes called forced turn channelizations, pork chops, or in their most common incarnation, right turn islands.

Used for:

- Traffic volume control.
- Discouraging commuter or other inappropriate traffic from entering or cutting through a neighborhood.
- Providing space for landscaping opportunities to increase community pride and sense of place.

Considerations:

- Diverters are a very strong measure and will have negative impacts on residents who use the street daily.
- Consider less restrictive measures first.
- Try to solve main corridor problem first. Will an intersection improvement curtail cut-through traffic?
- Diverters should have strong neighborhood support before they are installed.
- Used most effectively on grid streets, or other patterns where many linkages exist.
- Evaluate neighborhood traffic patterns to determine whether other streets and emergency operations, sanitation, school bus and transit would be adversely affected.
- It is often possible to build a diverter to permit emergency response and bus access.
- Design diverters with ramps to allow bicycle and ADA access.

Cost:

- The cost of a forced turn islands is \$11,000.

Appendix B

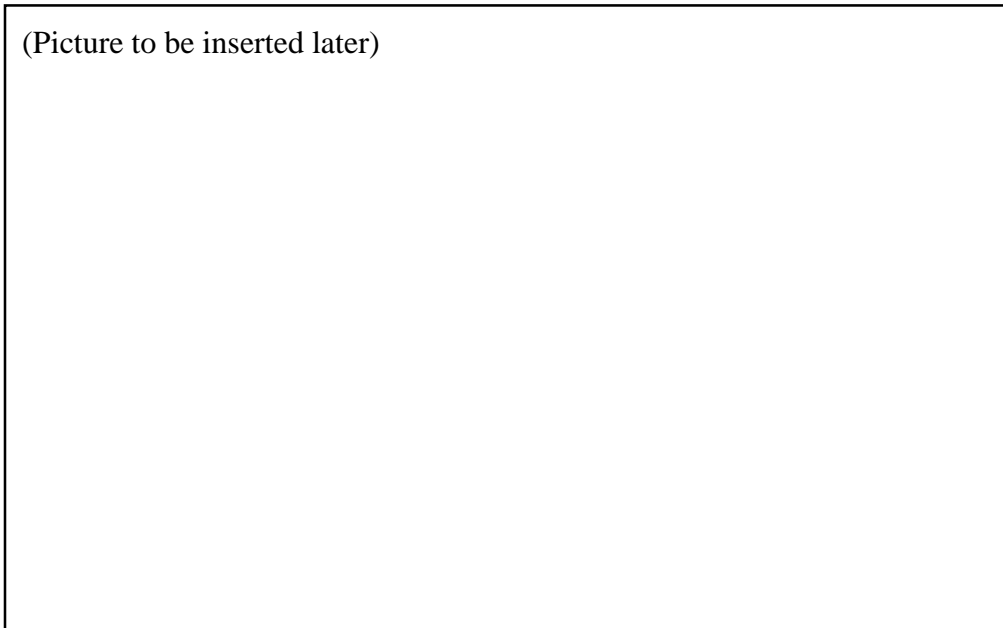
Traffic Diversion

TRAFFIC DIVERSION

Development of a traffic calming plan following the NTMP guidelines will include review of the impacts and issues related to the diversion of traffic.

Local Streets

Some of the traffic calming measures are diversionary. These measures are used to intentionally divert traffic away from the local streets. The intent is for the diverted traffic to use nearby arterial streets (through streets) instead. Although some of the diverted traffic may use adjacent local streets instead of the arterial streets, it is not acceptable for the traffic calming plan to result in excessive traffic increases on adjacent local streets. The “impact threshold curve” shown below, identifies an allowable range of increased traffic. The curve is applied to each adjacent local street to show how much additional traffic is appropriate, based in part on the street’s existing traffic levels.



LS = local service; vpd = vehicles per day

Impact Threshold Curve (Portland, OR)

The impact threshold curve is a guideline only, and may be modified to respond to particular street or neighborhood characteristics. In general, it establishes the following limitations:

- An increase of up to 150 vehicles per day is acceptable on any local street. The maximum amount of traffic increase on any local street is 400 vehicles per day.
- The total traffic volume on any local street (the existing volume plus the increase volume resulting from the project) should not exceed 3,000 vehicles per day.

Collector Streets

Traffic calming measures that intentionally divert traffic away from local streets cannot be used on collector streets. This is because the diverted traffic would likely use adjacent local streets, placing an

unacceptable traffic burden on them. Since collectors are meant to serve as through-streets, traffic calming plans are not intended to decrease traffic volumes. Instead, the emphasis is on traffic speed and its associated problems.

Appendix C

Emergency Response Delays

EMERGENCY RESPONSE DELAYS

Staff used the new publication by FHWA and ITE; *Traffic Calming State of the Practice* to estimate delays in emergency response times associated with the following traffic calming measures:

Traffic Calming Measure	Estimated Delay in Seconds
· Pavement Undulations	
Fire Engine	11.2 Sec
Ladder Truck	11.1 Sec
Pumper Truck	13.4 Sec
Ambulance (without patient)	9.1 Sec
Ambulance (with patient)	15.7 Sec
· Speed Table	7.3 Sec
· Traffic Circle	
Fire Engine	10.7 Sec
Ladder Truck	11.4 Sec
Pumper Truck	11.5 Sec
Ambulance (without patient)	7.7 Sec

Appendix D

Street Classifications

STREET CLASSIFICATION INDEX

<u>Street Name</u>	<u>Not Eligible</u>	<u>Local</u>	<u>Collector</u>	<u>Emergency Response</u>
Abbey Drive	X			
Acacia Lane		X		
Adlar Court	X			
Airpark Boulevard				X

Remainder of Streets to Follow