

# Carlsbad Residential Traffic Management Program



May 2011



# **Carlsbad Residential Traffic Management Program**



CITY OF  
**CARLSBAD**

**May 2011 Revision**

Traffic Division

Transportation Department

# Acknowledgments

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## May 2011 Program Update

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## **EXECUTIVE SUMMARY**

In all areas of Carlsbad, daily commuter traffic or other types of traffic drive on neighborhood streets. Speeding and/or excessive volumes may cause residents to become alarmed about safety and quality of life. When the tranquility and ambiance of the neighborhood is disrupted by drivers speeding or trying to find short-cuts, concerned citizens contact City officials.

This scenario, repeated each day in some areas of the City, alerted the City Council to the need for a comprehensive citywide program to minimize excessive speeds and high volumes in neighborhoods. Similar problems in California and throughout the country have inspired engineering solutions called traffic calming, which is a method of slowing cars and discouraging cut-through traffic. With traffic calming in mind, the City Council elected to use a citizen-based approach to develop such a program, appointing a committee of seven citizens to work with staff in developing solutions for any Carlsbad neighborhoods seriously affected by traffic problems.

The citizen's committee developed a three-phase approach to addressing traffic problems in Carlsbad neighborhoods. After reviewing and evaluating programs from many cities, the committee recommended a program it suitable for Carlsbad and which would achieve the three goals that must be met if traffic calming is to be successful. The first requirement is support of the residents in any neighborhood where such calming is needed. Second, the traffic calming measures must meet with the approval of emergency agencies concerned about response times, as well as the needs of other utilities whose large vehicles could be adversely affected or damaged by the traffic calming measures. Finally, the residents must be willing to live with the actual traffic calming measures designed to slow traffic and cut-through traffic volumes in their neighborhood.

This document represents the first revision to the initial program developed by the Carlsbad Residential Traffic Management Program Committee. The primary reasons for revising the program were to add lower cost traffic management tools such as residential stop signs and speed cushions and to establish benchmark criteria for the funding of future traffic calming projects. The revised program is divided into the following three phases:

Phase I: application of enforcement and education to resolve non-compliance issues.

Phase II: utilizing engineering-based measures to increase compliance with posted speed limits and discourage cut through traffic.

Phase III: development and implementation of a comprehensive plan comprised of traditional traffic calming measures to address traffic issues while enhancing the residential character of the street.

Ultimately leading to improvement in the quality of life of affected neighborhoods, the Carlsbad Residential Traffic Management Program is still another way in which the City provides for the health, safety and welfare of its citizens.

## CARLSBAD RESIDENTIAL TRAFFIC MANAGEMENT PROGRAM

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### INTRODUCTION

Virtually every day, on many residential streets, Carlsbad residents are faced with the potentially dangerous intrusion of speeding vehicles and/or cut-through traffic. Carlsbad streets have experienced escalating traffic impacts due to population and employment growth. As a result, an increasing number of citizens have expressed concerns to City officials, the Police Department and Engineering staff about these traffic problems.

Carlsbad residents are not unique in voicing such concerns. Cities throughout the United States have struggled with the issue of escalating traffic speeds and volumes on residential streets. As a result, citizens have asked that their neighborhood quality of life be improved through a reduction of vehicle speeds and volume. Many desire the simple pleasure of being able to walk or ride bicycles through their neighborhoods without fear of vehicular traffic, a key factor in neighborhood livability.

"Livable" cannot be precisely defined as it relates to community or neighborhood. However, the residents' expectation that fewer vehicles should be speeding down neighborhood streets is an indication of their desire to reside in a livable neighborhood. Characteristics of such a desirable neighborhood include:

- a sense of community
- a safe place to walk or bicycle
- interaction among neighbors
- a general feeling of security and safety
- the opportunity for residents to enjoy their homes and property
- streets that do not penalize drivers traveling at the posted speed limit

"Traffic calming" is a term that has, in recent years, become synonymous with providing the means to slow vehicles, reduce cut-through traffic volumes and help achieve a livable community. Through the use of a variety of measures, physical or otherwise, traffic calming helps reduce the undesirable effects of the motor vehicle in residential neighborhoods.

In response to the concerns of Carlsbad residents, the City Council has established the Carlsbad Residential Traffic Management Program, referred to as the CRTMP, to address neighborhood concerns about unwanted traffic. The Institute of Transportation Engineers (ITE), an international organization of transportation professionals, has defined traffic calming as:

*"The combination of mainly physical measures that reduces the negative effects of motor vehicle use, alters driver behavior and improves conditions for non-motorized street users."*

Carlsbad's Residential Traffic Management Program is designed to have significant neighborhood involvement. Staff plans to work closely with residents to identify problems and their solutions and to gather the support necessary to ensure the success of any traffic calming plan that may merit adoption. Communication with the residents at each step is critical and the urgency of plan development will not



be allowed to override the need for thorough understanding, commitment and approval by the neighborhood.

Since neighborhood involvement is the key, the program is designed to solicit and encourage residents' active participation in identifying concerns, developing reasonable solutions and supporting the final outcome. In the traffic engineering field, the manner in which this occurs is a process that contains the elements of the "4E's":

Education  
Engineering  
Enforcement  
Enhancement

By utilizing the "4E" process, which incorporates a comprehensive, integrated involvement of concerned residents, the challenge of identifying and resolving problems can successfully take place.

The basic elements of the 4E process include:

- Education: Providing resource materials and information to residents to inform them about all aspects of traffic calming.
- Engineering: Physical measures and other techniques utilized in the traffic calming program that are based upon input and concurrence by residents, engineering principles, financial and environmental considerations.
- Enforcement: Police presence and selective enforcement of vehicle code violations.
- Enhancement: Using special treatments in the physical measures through design and/or landscaping features to improve livability, aesthetics, community pride.

This program has been established with and conforms to authority and responsibility given to local authorities by the California Vehicle Code to protect the health and welfare of its citizens. Additionally, it meets one of the goals in the Circulation Element of the General Plan that states Carlsbad is a "City with an integrated transportation network, serving local and regional needs, which accommodates a balance of different travel modes based upon safety, convenience, attractiveness, costs, environmental and social impacts".

It is the policy of the State of California that all persons have an equal right to use public streets and that no agency may restrict the use of streets to only certain individuals. With certain exceptions provided for in the California Vehicle Code, the specific authority to regulate travel upon streets can only occur in specific instances related to:

- implementation of the Circulation Element of the General Plan
- criminal activity
- regulating or prohibiting processions or assemblages
- streets dividing school grounds to protect students attending such schools or school grounds

Requests to implement the CRTMP will ultimately be considered through the process outlined in this program. Careful consideration will be given to each request to ensure that it meets State law and the criteria contained in the program.

## **GOALS**

The City Council established the CRTMP as a countermeasure to intrusion by excessive traffic and/or higher than normal vehicle speeds in the neighborhood and thus, to help improve the quality of life. With a defined traffic management process and established procedures contained in this document, Carlsbad residents will have the measures and techniques ("tools") at their disposal to avert many negative impacts associated with vehicular traffic on residential streets.

The goals of a traffic management program include:

- improving the quality of life in the neighborhood
- creating safe streets by reducing the collision frequency and severity
- reducing negative effects of motorized vehicles
- design of features that encourage self-enforcement

## **PROGRAM STRATEGIES**

The City of Carlsbad strives to achieve neighborhood livability through implementation of current standards and policies. Managing traffic is a key component in this endeavor and one that is vital for promoting characteristics of livable neighborhoods. Therefore, strategies are needed to identify and address issues revolving around speeding, excessive volumes and safety concerns on residential streets when it occurs. These strategies include:

- developing recommendations that adhere to State law
- satisfactorily addressing legal and liability issues
- preserving reasonable emergency vehicle access and response time consistent with response standards
- maintaining reasonable vehicular access
- promoting neighborhood safety for pedestrians, bicyclists, motorists and residents
- encouraging and incorporating citizen participation in identifying traffic calming measures and techniques
- utilizing City resources and funds efficiently and effectively
- utilizing a combination of education, engineering, enforcement and enhancement (4E's)
- maintaining, encouraging and enhancing pedestrian, bicycle, transit and alternative modes of travel
- balancing on-street needs (such as parking) with the reasonable and safe function of the street
- considering achievable options for funding

According to the ITE resource, "Transportation and Land Development, 2<sup>nd</sup> Edition", residential streets should ideally be designed and constructed to a "residential neighborhood scale" to achieve vehicle speeds and traffic volumes consistent with typical neighborhood uses. Residential neighborhood scale is



typically accomplished by restricting roadway length so that a driver slows, stops, or makes a significant turning movement every 300-700 feet. Drivers tend to comply with speed limits in residential neighborhoods when the effective, uninterrupted street length is less than 700 feet.

Complaints related to excessive vehicle speeds often originate on residential streets that have not been designed to this residential neighborhood scale. The CRTMP attempts to resolve these types of speeding issues by installing a series of traffic management measures to reduce the effective street length so that a driver slows, stops, or makes a significant turning movement every 300 to 700 feet. Traffic management measures are recommended to be spaced, on average, at approximately 500 foot intervals. The traffic management strategies included in the CRTMP toolbox are designed to work in concert with one another to limit the effective, uninterrupted length of an existing street to approximately 500 feet, which should result in a reduction in vehicle speeds and render the route less attractive to cut-through traffic.

## **PROCEDURES**

The procedures to implement traffic management measures and techniques are described on the following pages and are referred to as phases. In general, the established procedures are consistent with the methodology currently used in Carlsbad to address any traffic-related concerns. The procedures require, and are designed to encourage, substantial neighborhood participation, following the process used by staff to formulate solutions to problem locations and the methods for proposing those solutions to the Traffic Safety Commission and City Council for final resolution.

Carlsbad's Residential Traffic Management Program has been developed as a three-phase program, consisting of the following structure approach:

- Phase I : Enforcement and Education
- Phase II : Traffic Management
- Phase III : Traffic Calming

The program is designed in such a way that residents of each street with identified problems, and with neighborhood support and commitment, can play a part in the program. The cost, complexity, effectiveness and impact to residents increase with each phase. Phase I features are generally considered simple improvements that can be initiated internally and provided by city staff. Phase II consists of cost-effective traffic management features that may reduce vehicle speeds but may also penalize those who drive at the legal speed limit. Phase III features are the most effective at traffic calming but are expensive and may negatively impact parking.

## **PROGRAM ELIGIBILITY**

Participation in the Carlsbad Residential Traffic Management Program requires the following:

1. The subject street must meet the legal definition of residence district (as defined by the California Vehicle Code) or designated school zone (as defined by the California Manual on Uniform Traffic Control Devices).
2. The subject street must have a curb-to-curb width of 40 feet or less.
3. A letter sent by a resident or residents requesting that staff consider a subject street for inclusion into the CRTMP process.

Any street that does not meet the program eligibility criteria but is nevertheless considered by city staff to be a candidate for traffic calming will be scheduled for review and possible approval by the Traffic Safety Commission. If the Commission's review leads to the conclusion that the street merits an exception, it will be processed through the CRTMP as if program eligibility criteria were met. Any street recommended by the Traffic Safety Commission as not qualifying for an exception may be requested by a citizen to be reviewed by the City Council for a final determination. The exception process may be used for consideration for inclusion into each phase of the program.



## **PHASE I: EDUCATION AND ENFORCEMENT**

When a resident, or group of residents, from a neighborhood has a traffic-related concern that they believe should be addressed by the Carlsbad Residential Traffic Management Program and have sent a letter to the Traffic Division of the Transportation Department, the process will be initiated in the following manner.

### **Step 1 Initiate Traffic Request (TR) Procedure**

Upon receipt of the correspondence and verification that the subject street satisfies program eligibility requirements, staff will initiate a Traffic Request (TR) that includes the information contained in the letter. The TR is an internal logging and tracking system in the Transportation Division used to initiate action and file correspondence. An engineer will be assigned to investigate and conduct an engineering study of the street(s).

### **Step 2 Investigation/Studies**

Staff will gather preliminary data about the expressed concern. Field reviews and appropriate traffic studies will be conducted. They may include:

- geometric conditions of the road
- parking availability/restrictions
- location of existing traffic control devices
- speed surveys
- volume counts
- pedestrian counts
- collision analysis
- other studies as determined appropriate

Phase I strategy will be formulated after the data is collected.

### **Step 3 Coordination with the Police and Fire Departments**

Staff will discuss with the Police Department solutions that can be addressed through enforcement. An enforcement strategy will be prepared and implemented by the officer in charge of the Traffic Division of the Police Department. Concurrently, staff will discuss with the Fire Marshal emergency response route issues and other fire safety issues.

### **Step 4 Issue Work Order**

Implementation of Phase I can be accomplished by city forces. Staff can usually issue work orders for the installation of signs or striping or implementation of speed feedback signs.

### **Step 5 Communication with Residents**

Information on appropriate traffic calming strategies and techniques proposed to address the identified concern is shared with the person or group that initiated the request, including information about the issuance of work orders. Staff also outlines the engineering and enforcement approach that will be utilized to mitigate neighborhood concerns.

**Step 6 Monitor**

Effectiveness of the implemented measures and/or strategies is monitored by Engineering Department staff and, as appropriate, by the Police Department. The resident or group originating the request is then informed of the monitoring results.

## **PHASE II: TRAFFIC MANAGEMENT**

If all applicable Phase I options have been completed and do not appear to adequately address the problem after being in place for an appropriate amount of time as determined by the city staff, Phase II of the CRTMP may be considered.

### **Step 1 Written Request**

Phase II will be initiated when an affected resident that resides on the street where the concern exists sends a letter to the Traffic Division of the Transportation Department requesting Phase II consideration. The letter will be generated by a resident, following discussions with city staff to review what might be accomplished through Phase II of the program.

### **Step 2 Phase II Eligibility Determination**

Not all residential streets and/or residential areas will qualify to participate in Phase II of the Carlsbad Residential Traffic Management Program based upon the established process. Eligibility criteria for Phase II are as follows:

1. Completion of Phase I of the CRTMP; and
2. The 85<sup>th</sup> percentile speed (critical speed) must be 32 miles per hour or greater as determined by a speed survey(s).

Both of the eligibility criteria must be met for a street to be considered for further processing through the CRTMP. However, on a case-by-case basis, city staff may determine exceptions. A street considered as an exception must be approved by the Traffic Safety Commission.

### **Step 3 Determine Project Area of Influence (PAOI)**

The street or streets significantly impacted by neighborhood concerns or potential solutions, including all dwelling units or other land uses bordering the subject street or streets, comprise the Project Area of Influence (PAOI). The PAOI will be established by city staff, with input from the neighborhood representatives. The establishment of the PAOI by staff shall consider the implementation of measures on a roadway system as opposed to singular, isolated installations.

### **Step 4 Phase II Concept Plan**

All residents from the PAOI will be invited to a neighborhood meeting hosted by the city. At the meeting, staff will explain the Phase II process that may lead to installation of the traffic management measures proposed for their neighborhoods. Discussion will include:

- neighborhood concerns
- traffic data gathered
- results from Phase I
- potential Phase II solutions
- advantages/disadvantages of specific Phase II features
- Phase II approval process

A Fire Department representative will be invited to attend the meeting to explain response needs of the emergency service providers and any concerns with potential traffic management on the candidate

street. Also, a Police Department representative will be invited to attend the meeting to respond to questions about enforcement issues.

Staff, using the data collected in Phase I, and working with affected residents, will draft a plan of proposed Phase II measures within the boundaries of the PAOI. Since Phase II measures are limited in application, they may not be appropriate for a given situation. For example, if a subject street does not feature intersections, residential STOP signs would not be appropriate. Staff will work with residents to prepare the Phase II concept plan which will be presented to the neighborhood via mail survey for support.

The concept plan will be presented to the Traffic Safety Coordinating Committee to allow city staff such as Fire Department and Police Department representatives to review and comment.

#### **Step 5 Mail Support Survey for Phase II Concept Plan**

A mail support survey will be conducted by City staff upon completion of the Phase II concept plan developed by staff. The purpose of the survey will be to determine if the neighborhood (as defined by the PAOI) is in favor of the proposed plan.

Residents and non-resident owners within the PAOI are eligible to participate in the mail support survey. Distribution of the support survey will be conducted by the City through the mail. The survey will be considered valid if a minimum of 50% of the residents contacted fill out and return the completed survey. Staff will then analyze the returns to determine if 67% or more of the PAOI community responding supports the Phase II plan.

If the Phase II concept plan includes measures with vertical deflection such as speed cushions or speed tables, support for these measures from residents directly affected will be highly desirable. Staff will work with these residents and will strive to balance the concerns of individual residents with the overall success of the concept plan as a system of interdependent features. Since the success of Phase II will be dependent on the spacing of proposed features, the removal of any measure from the concept plan due to lack of support may have a detrimental effect on the concept as a whole.

If 50% of the surveys are not returned, an outreach program may be initiated by the resident(s). Re-survey will occur after all steps established in the outreach program are completed. A re-survey will be valid if 50% or more of the surveys are returned to staff. If the plan is not approved by 67% or more of the returned surveys, the resident(s) may request that staff develop an alternative plan or abandon their efforts. A revised Phase II plan will be tested by the support survey process in this step. If the revised plan fails to garner support of the residents in the PAOI after the second survey, no further surveys will be conducted by City staff for a minimum of one year.

#### **Step 6 Final Approval by the City Council**

The approved Phase II concept plan will be brought forward to the Traffic Safety Commission for recommendation and to hear public testimony on the matter. A duly noticed public meeting will be held by the City Council to receive the recommendations of the Traffic Safety Commission for Phase II implementation. If Council decides that Phase II is acceptable as presented, it will so indicate by adopting an ordinance authorizing installation of residential STOP signs and/or other proposed measures and authorizing the appropriation of any necessary funds. The Council may consider other



options such as returning to the neighborhood for refinement of the Phase II concept plan or proceeding to Phase III of the CRTMP.

**Step 7 Phase II Implementation**

Implementation of Phase II, in most cases, will be performed by city forces via work orders issued by staff.

**Step 8 Phase II Monitoring**

Phase II measures that have been installed will be monitored for effectiveness during the first year following completion of the installation. Staff will analyze traffic data results, accident history, observed deficiencies and/or impacts of the Phase II measures, comments, and suggestions or complaints received.

If some residents of the neighborhood believe that the impacts and results of Phase II do not meet their expectations, they may request removal of the permanent measures. The request for removal must follow the Traffic Calming Measures Removal Process and be submitted at least one year from date of Phase II installation.

## **PHASE III: TRAFFIC CALMING**

If applicable Phase II options have been evaluated and do not appear to adequately address the problem as described previously, Phase III of the CRTMP may be considered. Phase III of the CRTMP is designed to allow traditional traffic calming measures to be used in areas where Phase II options have not adequately resolved the traffic issues. Due to the potential fiscal impacts of Phase III and probable impacts to parking capacity and limit access to properties, residents will be required to first utilize Phase II measures before requesting to proceed to Phase III. Phase III measures will be limited to locations where re-routed traffic will only impact higher classified roadways. Residents have the option to bypass Phase II only if funding is privately secured and all Phase III criteria are satisfied.

### **Step 1 Written Request**

Phase III will be initiated when the affected residents send a letter to the Traffic Division of the Transportation Department requesting Phase III consideration. The letter will be generated by the residents following discussions with city staff, study of Police Department results of Phase II, and anticipation of what might be accomplished through further utilization of the CRTMP process. The Phase III process will require an evaluation of a qualification criteria as well a neighborhood-initiated support petition.

### **Step 2 Project Scoring and Qualification Criteria**

Candidate streets will be evaluated on the following factors and associated points for the purpose of establishing a project score for funding considerations. Streets with a score exceeding 50 points will be eligible for Phase III.

Criteria and points assigned are as follows:

1. Travel Speed (maximum 40 points):  
6 points for each mile per hour the 85<sup>th</sup> percentile speed is over 32 miles per hour.
2. Traffic Volumes (maximum 30 points):  
Typical weekday ADT divided by 100 and rounded to the nearest whole number or the weekday peak hour volume divided by 10 and rounded to the nearest whole number.
3. Collision History (maximum 15 points):  
Five points will be assigned for each correctable collision on a street, including intersections, within the past five years. A correctable collision is one that might have been prevented by the installation of a traffic control device or traffic calming measure.
4. Sidewalks (maximum 5 points):  
5 points if no sidewalk or pedestrian pathway exists on either side of the street.  
5 points if no sidewalk or pedestrian pathway exists along at least one side of the street.
5. School Proximity (5 points maximum):  
5 points if school grounds abut the candidate street.  
3 points if the PAOI is within 500 feet of school grounds.  
1 point if the PAOI is located within 1,000 feet of school grounds.

6. Pedestrian Crossings (5 points maximum):

5 points if a school crosswalk (yellow crosswalk) is located on a street in the PAOI.

5 points if a major or midblock crosswalk is located on a street in the PAOI. A major crosswalk is defined as having 10 or more pedestrians crossing per hour during any eight hours of a typical weekday.

A maximum total of 100 points may be given for the street under consideration, using the Traffic Management Program Priority Scoring Worksheet. **A minimum score of 51 points is required for the subject street to qualify for Phase III.**

# Carlsbad Residential Traffic Management Program

## Phase III Qualification Criteria

### Scoring Worksheet

This worksheet will be completed by City of Carlsbad staff. It will be used to assign points to a street for Phase III qualification and prioritization of a potential specific neighborhood traffic calming project.

Name of neighborhood (street location): \_\_\_\_\_

	Points
<b>1. Travel Speed (40 pts. max.)</b> For each mile per hour the 85 <sup>th</sup> percentile speed is over 32 miles per hour, 6 points will be assigned. Critical Speed: _____	_____
<b>2. Traffic Volumes (30 pts. max.)</b> Total weekday ADT divided by 100, rounded to nearest whole number or weekday peak hour volume divided by 10, rounded to nearest whole number (use higher number) Volume: _____ Date Counted: _____	_____
<b>3. Collision History (15 pts. max.)</b> Five points for each correctable collision during the past 5 years Number of collisions: _____	_____
<b>4. Sidewalks (5 pts. max.)</b> No sidewalk or pedestrian pathways exists on either side of the street = 5 points No sidewalk or pedestrian pathway exists along at least one side of the street = 5 points	_____
<b>5. School Proximity (5 pts. max.)</b> School grounds abut candidate street = 5 points PAOI is located within 500 feet of school grounds = 3 points PAOI is located within 1,000 feet of school grounds = 1 point	_____
<b>6. Pedestrian Crossings (5 pts. max.)</b> School crosswalk (yellow crosswalk) is located on a street in the PAOI = 5 points Major or midblock crosswalk is located on a street in the PAOI = 5 points	_____
<b>Total Score:</b>	_____

\_\_\_\_\_  
 Evaluator Date

**A MINIMUM SCORE OF 51 POINTS IS REQUIRED TO QUALIFY FOR PHASE III.**



### **Step 3 Neighborhood Support Petition**

If the subject street meets the Phase III Qualification Criteria, concerned residents will need to establish resident support for continuation of the Phase III process. The support petition is initiated by the neighborhood representative and serves as the mechanism to establish that residents' support the City's consideration of a Phase III traffic calming project. Documentation of support for consideration of a future project is indicated by a simple majority (50% plus one signature) of those eligible individuals located within the PAOI that sign the petition. The petition form will be developed by staff but it will be the responsibility of residents to circulate the petition and submit the results.

### **Step 4 Project Funding**

Upon satisfaction of Steps 2 and 3 of the Phase III process, the subject street may be considered for funding as a future project through the Capital Improvement Program (CIP) process. If more than one CRTMP project is submitted in a given fiscal cycle, priority will be established by the Phase III Qualification Criteria scoring. Many different fiscal factors must be considered to establish if and to what level funds will be allocated for projects on the priority list. Staff will recommend a funding level and the City Council will consider and adopt the annual budget before the fiscal year ending on June 30.

As an alternative to the City funding the design and construction of Phase III improvements, residents may choose to collect funds themselves in any manner they choose, including the formation of an assessment district. This private funding must be for 100% of the project cost including design, construction, inspection, administration and contingency costs associated with the project. Private funds must be deposited with the city prior to proceeding to Step 4.

Phase III will not proceed until funding source is identified and funds are secured.

### **Step 5 Kick-off Meeting with the Neighborhood**

All individuals from the PAOI will be invited to a neighborhood kick-off meeting hosted by the City. At the meeting, staff will explain to those in attendance the Phase III process that may lead to installation of the traffic calming measures proposed for their neighborhoods. Discussion will include:

- neighborhood concerns
- traffic data gathered
- results from Phase I and II
- potential solutions
- traffic calming plan development process
- before and after traffic study process

A Fire Department representative will attend the meeting to explain response needs of the emergency service providers and any concerns the Fire Department has with potential traffic calming on the candidate street. Also, a Police Department representative will attend the meeting to respond to questions about enforcement issues.

### **Step 6 Develop the Conceptual Neighborhood Traffic Calming Plan**

By meeting and working closely with the residents, staff will be able to assist in:

- assessing neighborhood needs
- identifying alternatives
- developing initial plans or solutions
- finalizing the comprehensive plan based upon
  - sound engineering principles
  - neighborhood input
  - state-of-the-art traffic calming practices

Throughout design development of the conceptual plan, all residents within the PAOI will be provided updates and will be encouraged to offer input. The residents will be actively involved in all aspects of developing the comprehensive neighborhood traffic calming plan and will be expected to commit the time and effort needed to develop a successful plan. Directly affected residents and property owners will be notified and involved with the development of the conceptual plan.

The length of time needed to develop the conceptual plan is dependent upon the complexity of the issues, the level of neighborhood involvement and support, project cost and the willingness of the residents to aggressively pursue plan development. The series of meetings leading to completion of a final conceptual plan for presentation to the neighborhood could take six months or longer.

#### **Step 7 Mail Support Survey for Final Conceptual Plan**

A mail support survey will be conducted by city staff upon completion of the conceptual plan developed by residents and staff and evidence of a generally favorable consensus on the plan by interested residents. The purpose of the survey will be to determine if the neighborhood (PAOI) is in favor of the proposed plan by a super majority (67% or more).

Residents and non-resident owners within the PAOI will be included in the survey, essentially following the eligibility procedures addressed in Phase II. If necessary, and as determined by city staff based upon the proposed conceptual traffic calming plan, additional properties may be included or excluded by expanding or reducing the boundaries of the PAOI. The revised PAOI will become the new PAOI for purposes of the survey and other communications with residents affected by the proposed traffic calming project.

Distribution of the support survey will be conducted by the City through the mail. The survey will be considered valid if a minimum of 50% of those contacted fill out and return the survey. Staff will then analyze the returns to determine if 67% or more of the PAOI community responding supports proceeding to the final plans, specifications and estimates (PS&E) stage and for the installation of temporary features. Staff will notify by mail all individuals within the PAOI of the survey results and the next steps in the process.

If 50% of the surveys are not returned, an outreach program must be developed by the residents with the assistance of staff. Re-survey will occur after all steps established in the outreach program are completed.

A re-survey will be valid if 50% or more of the surveys are returned to staff. If the plan is not approved by 67% or more of the returned surveys, the residents may choose to develop an alternative plan or abandon their efforts. A revised conceptual plan, after an appropriate outreach program, will be tested by the support survey process in this step. If a conceptual plan fails to garner support of the residents in

the PAOI after the second survey, no further surveys will be conducted by city staff for a minimum of one year.

If neighborhood support for the Phase III traffic calming concept plan is established, staff can proceed to Step 8.

#### **Step 8 Environmental Review**

Upon confirming the neighborhood support for the Phase III concept plan and funds have been identified, allocated and approved, staff will initiate environmental review of the proposed project through the City of Carlsbad Planning Department. Generally, traffic calming improvements proposed within the existing street right-of-way are found to be exempt from detailed environmental review.

#### **Step 9 Complete Final Design**

Final design of the traffic calming plan can be started by staff concurrent with processing the environmental document. However, the final plan cannot be completed beyond the 30% stage until environmental certification is received and funding for the project is secured. Depending upon the complexity of the final plan, a consultant may be hired by the city. After completion of the final design, staff will initiate installation of temporary measures to simulate the effect of the proposed permanent traffic calming measures. The Police and Fire Departments will have considerable input during the final design.

#### **Step 10 Final Approval by the City Council**

The approved Phase III design plan will be brought forward to the Traffic Safety Commission for recommendation and to hear public testimony on the matter. A duly noticed public meeting will be held by the City Council to receive the recommendations of the Traffic Safety Commission for the final traffic calming project and to hear public testimony on the matter. If Council decides the project is acceptable, it will so indicate by adopting a resolution authorizing advertising for construction bids, thus taking the first step toward installation of the project. If, on the other hand, the Council does not support the proposal, staff may be directed to abandon the plan, or to return to the neighborhood for refinement of the plan, or to take no further action.

#### **Step 11 Project Construction**

Construction of the approved project, in most cases, will be performed by a licensed contractor selected through the city's formal construction bidding process. After a contractor is selected by the city, individuals within the PAOI will be notified of the construction schedule.

#### **Step 12 Project Monitoring**

Traffic calming projects that have been constructed will be monitored for effectiveness during the first year following completion of the installation and also during the second year after the installation.

If residents of the neighborhood believe that the traffic calming measures, impacts and results do not meet their expectations, they may request removal of the permanent measures. The request for removal must follow the Traffic Calming Measures Removal Process and be submitted at least one year from date of Phase III installation.

## **Traffic Calming Measures Removal Process (Phase II and III)**

Individuals within a neighborhood may determine that one or more traffic calming measures should be removed. If so, a petition favoring removal and signed by 80% of the eligible individuals within the PAOI or expanded PAOI, if applicable, must be sent to staff. Eligibility criteria for signing the petition will be the same as for previously indicated voting procedures (one signature per household or property). A sample petition is provided on the next page for use by the neighborhood contact person to collect signatures.

Staff will review the petition, determine if the 80% threshold is met and notify all residents and non-resident owners within the PAOI of the results. No removal petition will be accepted by staff during the test period when temporary measures are being reviewed.

If the petition has 80% or more valid signatures, it will be submitted to the Traffic Safety Commission for consideration. All individuals within the PAOI will be notified in writing of the meeting and will have the opportunity to address the Commission with their concerns. The Traffic Safety Commission recommendation, whether to deny or sustain the removal petition, will be forwarded to the City Council.

All residents and non-resident owners within the neighborhood PAOI will be notified by mail of the date when the City Council will consider their request for removal of the traffic calming measure(s). Each interested resident will have the opportunity to address the City Council. A final decision will be made by the City Council based upon staff input, Traffic Safety Commission recommendations and citizen comments. As appropriate, staff will initiate action on the City Council's decision. All residents and non-resident owners within the PAOI will be notified of the City Council decision by mail.



# PETITION

## REQUEST TO REMOVE TRAFFIC CALMING MEASURE(S) CARLSBAD RESIDENTIAL TRAFFIC MANAGEMENT PROGRAM

CONTACT PERSON: \_\_\_\_\_ DATE: \_\_\_\_\_

CONTACT PERSON ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

CONTACT PERSON TELEPHONE: \_\_\_\_\_

The undersigned state they that they are requesting that the City of Carlsbad consider removing the traffic calming measure(s) installed on \_\_\_\_\_ (street name).

The measure or measures to be removed are: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

The undersigned further state they have read the Travel Calming Removal Process section contained in the Carlsbad Residential Traffic Management Program.

<b>Name (please print)</b>	<b>Address (please print)</b>	<b>Telephone</b>	<b>Signature</b>
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*(attach additional sheets as necessary)*

## **PROGRAM UPDATE PROCEDURES**

It is intended that the Carlsbad Residential Traffic Management Program be dynamic and subject to change. Traffic calming measures, techniques and/or methodologies continue to evolve. What was once in favor and popular to implement may have been subsequently found by agencies to be undesirable, unworkable or unacceptable to the neighborhood.

Revisions to the Carlsbad Residential Traffic Management Program (CRTMP) are expected. When revisions are suggested, a formal review and approval process of the revision(s) will be followed.

Steps in the revision/update process are as follows:

### **Step 1 Initiation of Revision**

A change or revision may be initiated by the City Council, staff or a citizen. It is suggested that the requested revision be made in writing, with the reasons for or intent of the revision clearly stated. A compelling reason to initiate the update process or to change the process must be offered to be favorably received.

### **Step 2 Review by Staff**

Suggested revisions will be thoroughly researched and reviewed by staff to determine if they are appropriate for inclusion in the Carlsbad Residential Traffic Management Program. Other City departments will also be consulted and, as necessary, comments from stakeholders will be solicited. Changes to traffic calming measures, procedures or methodologies will only be considered by the Traffic Safety Commission once a year, unless such measures, procedures or methodologies are determined to be illegal.

### **Step 3 Response to Initiator**

Staff will respond in writing to the individual proposing the revisions, commenting on their suitability or requesting additional information as needed. Revisions deemed unacceptable by staff will not be processed further. Revisions recommended by staff for further consideration will be scheduled for discussion at a Traffic Safety Commission meeting. Only those suggested revisions that significantly enhance the overall Carlsbad Residential Traffic Management Program will be considered for acceptance and submitted to the Traffic Safety Commission.

### **Step 4 Review by the Traffic Safety Commission**

All revisions proposed during any 12-month period will be reviewed by the Traffic Safety Commission at the end of such period. The recommendations of the TSC on all such proposed revisions will be forwarded to the City Council. The TSC review meetings will be duly noticed and open to the public for their input on revisions or changes.

**Step 5 Review and Approval by the City Council**

In a public meeting, the City Council will consider the recommendations of the Traffic Safety Commission. Staff may be directed by the Council either to implement the revisions to the program and the supporting documents or to take no action on the requested revision. Noticing procedures for the Council meeting will be the same as for the Traffic Safety Commission meeting and all interested residents will be encouraged to attend the Council meeting to make their opinions known.

Proposed revisions will not interfere with or delay the processing of a neighborhood traffic calming program in progress. A neighborhood that has started development of its traffic calming program will continue the process without change.

## **Measures Not Recommended for Use**

Several traffic management measures were evaluated and determined to be unsuitable for use in Carlsbad. Listed following are measures not recommended for installation on public streets and, therefore, not proposed for consideration as part of a neighborhood traffic calming project.

### **Rumble Strip**

A rumble strip is an alteration to the paved street surface by various techniques to draw the driver's attention to a roadway condition. This measure is not acceptable in a residential neighborhood due to the noise and vibration created when a vehicle is driven over the rumble strip.

### **One-Way Street**

A one-way street may encourage increased speeds and may result in additional traffic volumes on a nearby street due to diverted traffic. On a residential street, confusion and wrong-way travel may result as a one-way street is an atypical encounter for drivers when leaving a single-family residence.

### **Miscellaneous Non-Standard Devices**

Signs and/or striping not recognized by the State of California Department of Transportation (Caltrans) as an official traffic control device shall not be used in the public right-of-way. These signs typically include CHILDREN AT PLAY, SLOW and others. Non-official signs are of the novelty type, many have messages that are misinterpreted by drivers, have no legal meaning and their use can expose the City to tort liability. These types of signs do not command the attention or respect of drivers that are repeat users of the street. Using signs that are not officially approved may give a false sense of security to residents. Additionally, the signs raise expectations that some degree of protection is provided through their use when, in reality, this is not the case.

### **Cul-de-Sacs and Road Closures**

Streets have been designed and constructed to facilitate multiple points of egress for the residents and multiple ways for an emergency vehicle to respond to an incident. Basic circulation patterns are intended to remain. Streets will not be truncated through the construction of a barrier to cause a road closure or by converting the end of the street into a cul-de-sac through construction of a turnaround.

## **ACRONYMS AND GLOSSARY**

California Vehicle Code	A document published by the Department of Motor Vehicles containing laws relating to the use of streets and the operation of vehicles thereon.
Circulation Element	Comprehensive plan in Carlsbad for the safe and efficient movement of people and goods.
Critical Speed (85 <sup>th</sup> percentile)	The speed at which 85% of the vehicles are traveling at or below.
General Plan	A document required by law that contains the overall goals, objectives and policies for development of the City.
ITE	Institute of Transportation Engineers
Midblock	Any point located between two successive intersections.
NTCC	Neighborhood Traffic Calming Committee
PAOI	Project Area of Influence
PS&E	Plans, specifications and estimates used to construct projects.
Traffic Calming	The combination of mainly physical measures that reduces the negative effects of motor vehicle use, alters driver behavior and improves conditions for non-motorized street users—ITE definition.
CRTMP	Carlsbad Residential Traffic Management Program
Toolbox	Traffic calming measures ("tools") used to reduce vehicle speeds and/or minimize volumes on residential streets.
TR	Traffic Request. Used by transportation staff to log, file and track project requests.
TSC	Traffic Safety Commission
Warrants	Established, objective criteria used to evaluate traffic conditions.

EXHIBIT 1

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RESOLUTION NO. 2011-115

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CARLSBAD, CALIFORNIA, APPROVING THE REVISED CARLSBAD RESIDENTIAL TRAFFIC MANAGEMENT PROGRAM THAT ESTABLISHES THE POLICY FOR TRAFFIC CALMING ON RESIDENTIAL STREETS.

WHEREAS, the City of Carlsbad is committed to recognizing the residential character of its residential public streets; and

WHEREAS, the City has responded to concerns regarding traffic issues in neighborhoods; and

WHEREAS, the City has determined that speeding and excessive traffic volumes on residential streets are to be discouraged; and

WHEREAS, through the traffic management process, the City desires to have a logical, consistent, and viable methodology for managing traffic issues in residential neighborhoods; and

WHEREAS, the policies, procedures and methodology for traffic management on residential public streets are specified in the Carlsbad Residential Traffic Management Program, as revised May 2011.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Carlsbad, California, as follows:

1. That the above recitations are true and correct.
2. That City Council hereby establishes that the policy, standards and methodology to be considered for managing traffic on residential public streets is set forth in the Carlsbad Residential Traffic Management Program, as revised May 2011, and any subsequent revisions thereof.

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PASSED, APPROVED AND ADOPTED at a Regular Meeting of the City Council  
of the City of Carlsbad on the 24<sup>th</sup> day of May , 2011, by the following vote to wit:

AYES: Council Members Hall, Kulchin, Blackburn, Douglas, Packard.

NOES: None.

ABSENT: None.

  
MATT HALL, Mayor

ATTEST:

  
LORRAINE M. WOOD, City Clerk  
(SEAL)



## TRAFFIC CALMING TOOLBOX

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Traffic control devices are those official signs and striping placed in the public right-of-way and recognized by the public such as STOP signs, curve warning signs, centerline striping, etc. These devices have been officially approved by the State of California Department of Transportation (Caltrans) pursuant to legislative authority provide for in the California Vehicle Code.

Traffic calming measures, however, have evolved to include features that may not be officially approved through legislative action by the State of California. Commonly referred to as “tools”, the traffic calming measures or features available for use in Carlsbad are available in this program’s “toolbox”.

Each tool listed is unique and has a specific purpose for addressing residential street traffic concerns that require some form of traffic calming. Each tool has its own set of advantages and disadvantages and a range of costs. More than just a structural feature on a street, traffic calming tools also encompass education, enforcement, engineering and enhancement.

The following pages identify tools that have been endorsed and available for use in Carlsbad. They were chosen for:

- Appropriateness to address traffic concerns in Carlsbad.
- Acceptability to stakeholders including the Fire and Police Departments.
- Suitability for use in residential neighborhoods.

Each traffic calming measure is briefly described, application for usage listed, and possible advantages and disadvantages outlined. Estimated costs have been provided when the cost of the measure was able to be determined.





## Phase I Education

### Description:

Conversations, meetings, e-mails, letters and handouts to residents regarding neighborhood traffic and pedestrian safety issues.

### Application:

Traffic education is intended to make residents aware of local residential speed limits and other neighborhood traffic and safety concerns.



### Advantages:

- Allows residents to express views and obtain answers.
- Identifies issues of concern and solutions.

### Disadvantages:

- Effectiveness may be limited.
- Potentially time consuming.
- Limited audience.

### Special Considerations:

- Meetings need to stay focused on specific traffic issues.

### Cost:

- Varies (staff time and published materials).

## Phase I

# Police Presence

### Description:

Police vehicles drive through or stop for a few minutes on residential streets to observe driver behavior.

### Application:

Police presence is used to make a visual showing in residential neighborhoods to help discourage speeding.



### Advantages:

- Shows an enforcement presence.
- May help slow vehicle speeds.

### Disadvantages:

- Presence without enforcement has limited effectiveness.
- Limited police resources.

### Special Considerations:

- Typically only effective when officer is present.
- Used on residential streets with complaints of speeding.

### Cost:

- N/A

## Phase I

# Police Enforcement

### Description:

The Police Department deploys motorcycle or automobile officers to perform targeted enforcement on residential streets.

### Application:

Targeted police enforcement used to make drivers aware of local speed limits and to reduce speeds by issuing citations.



### Advantages:

- Effective, visible enforcement.
- Driver awareness increased.
- Can be used on short notice.
- Can reduce speeds temporarily.

### Disadvantages:

- Temporary measure.
- Requires long-term use to be effective.
- Limited police resources.

### Special Considerations:

- Typically only used on residential streets with documented speeding problems.
- Typically only effective while officer is actually monitoring speeds.
- Benefits are short-term without regular periodic enforcement.
- Expensive.

### Cost:

- N/A

## Phase I

# Speed Feedback Signs

### Description:

A portable device equipped with a radar unit that detects, displays and records the speed of passing vehicles. The sign can be set to display the speed on its screen or show a blank screen for data collection only.

### Application:

May help discourage speeding on neighborhood streets through education (when set on display mode) by showing drivers their current speed.



### Advantages:

- Effective educational tool.
- Good public relations tool.
- Encourages speed compliance.
- Can reduce speeds temporarily.

### Disadvantages:

- Not an enforcement tool.
- Ineffective on multi-lane roadways.
- Less effective on high volume streets.
- Limited Police Department resources to install

### Special Considerations:

- Can be installed on a street light standard where a resident indicates there is a speeding problem.
- Typically only effective in reducing speeds when the sign is present and set on display mode.
- Some motorists may speed up to try to register a high speed (when on display mode).
- Recommend for temporary use only.

### Cost:

- \$5,000 each unit

## Phase I

# Speed Limit Signs

### Description:

25 mile per hour speed limit signs are installed on neighborhood residential streets that meet the legal definition of a RESIDENCE DISTRICT.

**Application:** Speed limit signing encourages slower vehicle speeds along residential streets. Signs are only installed along streets where speeding is a problem.



### Advantages:

- Clearly indicates prima facie speed limit.
- Usually popular with residents.
- Low cost of installation.

### Disadvantages:

- Not effective by themselves.
- May add to sign clutter.
- Increased cost of sign maintenance.

### Special Considerations:

- Typically only installed on streets where speeding is a documented problem.
- Requires police enforcement to be effective.

### Cost:

- \$200 per sign.

## Phase I

# Speed Limit Pavement Legends

### Description:

Painting of speed limit legends on the roadway adjacent to speed limit signs.

### Application:

Speed limit pavement legends increase driver awareness of the speed limit to help reduce speeding.



### Advantages:

- Supplement to speed limit signs.
- May help reduce speeds.
- Usually popular with residents.

### Disadvantages:

- Not effective or legal by themselves.
- Increase in maintenance cost.

### Special Considerations:

- Should only be installed on streets where speeding is a documented problem.

### Cost:

- \$350 per legend.



## Phase I

# Warning Signs

### Description:

Standard warning signs give drivers advanced notice of roadway conditions.

### Application:

Warning signs advise motorists to reduce their speed.



### Advantages:

- Informs motorists of roadway conditions.
- Low cost of installation.

### Disadvantages:

- May add to sign clutter.
- Increased cost of sign maintenance.
- Not a regulatory sign.

### Special Considerations:

- Advisory only, cannot be enforced.

### Cost:

- \$200 per sign.



## Phase I

# Neighborhood Speed Monitoring Program

### Description:

Resident writes down the license plate number of vehicle(s) observed to be speeding noting date, time & location. Information is called in to the Traffic Division of the Police Department. The Police Department sends a letter to the registered vehicle owner informing them their vehicle was observed to be speeding on the stated street on the specified date, time & location. The vehicle owner is informed that residents are very concerned about speeding & are requested to observe the 25 mph residential speed limit.

### Application:

The Neighborhood Speed Monitoring Program helps to discourage speeding through neighborhood & Police Department involvement, awareness & neighborhood peer pressure.



### Advantages:

- Encourages speed compliance.
- Creates neighborhood involvement and awareness.

### Disadvantages:

- Not an enforcement tool.
- Requires Police Department resources to send letters.

### Cost:

- police Department staff time to send out letters.

## Phase II

# Residential STOP Signs

### Description:

Residential stop signs may be considered for installation under special circumstances for speed reduction at intersections on residence district streets.

### Application:

The installation of residential stop signs at intersections reduces the uncontrolled length of a street, which may help to reduce vehicle speeds on the street.

### Advantages:

- May help reduce vehicle speeds within 150-200 feet of intersection.
- Favored by many residents.
- Low cost of installation.



### Disadvantages:

- Non-enforcement may lead to a general non-compliance of stop signs.
- May divert traffic to other streets.
- Emergency response times slightly impacted.
- Increased maintenance costs
- May lead to increased noise/air pollution
- Not as effective as horizontal deflection measures such as traffic circles.

### Special Considerations:

- To control vehicle speeds, the recommended spacing of this traffic calming measure on a residential street is typically between 300 to 700 feet.
- Requires stop limit line and stop legend to be painted on the street which may lead to sign clutter.
- Requires stop limit line and stop legend to be painted on the street.

### Cost:

- \$2,000 (two approaches) - \$4,000 (four approaches).

## Phase II

# Speed Table

### Description:

Speed tables are constructed 3 to 4 inches above the elevation of the street. They feature ramps on the approaches and a flat top, typically about the length of a passenger car.

### Application:

Speed tables help reduce vehicle speeds at mid-block locations.



### Advantages:

- Reduces vehicle speeds.
- Access not affected.
- Generally results in a gentler ride as compared to speed lumps.

### Disadvantages:

- May increase noise.
- Emergency response times affected.
- Increased maintenance costs.
- Perception of reducing property values.
- May not be as aesthetically pleasing as chicanes.

### Special Considerations:

- Requires special signing and markings which may lead to sign clutter.
- Careful attention required for drainage issues and other design issues.
- Works well in combination with curb extensions and curb radius reductions.
- At existing crosswalk locations, a crosswalk may be painted on the proposed speed table.

### Fire Department and Police Department Evaluation:

Fire Department and Police Department shall have final approval of speed table locations and spacing.

### Cost:

- \$8,000 - \$14,000 each (prefabricated).

## Phase II

# Speed Cushions

### Description:

Prefabricated rubber or field formed asphalt approximately 3 inches in height and 7-12 feet in length installed in a series across a roadway. Transverse cuts across the cushion allow some emergency vehicles to pass without vertical deflection.

### Application:

Reduce vehicle speeds without significantly impacting some emergency vehicle response time.



### Advantages:

- Reduces vehicle speeds.
- May reduce vehicle volumes.

### Disadvantages:

- May increase noise.
- Aesthetics.
- May divert traffic to other streets.
- Perception of reducing property values.
- Increased maintenance costs.
- Some emergency vehicles impacted by slowing response times.

### Special Considerations:

- Requires special signing and markings.
- To control vehicle speeds, the spacing must be carefully evaluated.

### Fire Department and Police Department Evaluation:

Fire Department and Police Department shall have final approval of speed lump locations and spacing.

### Cost:

- \$4,000 - \$6,000 each (prefabricated).

## Phase II

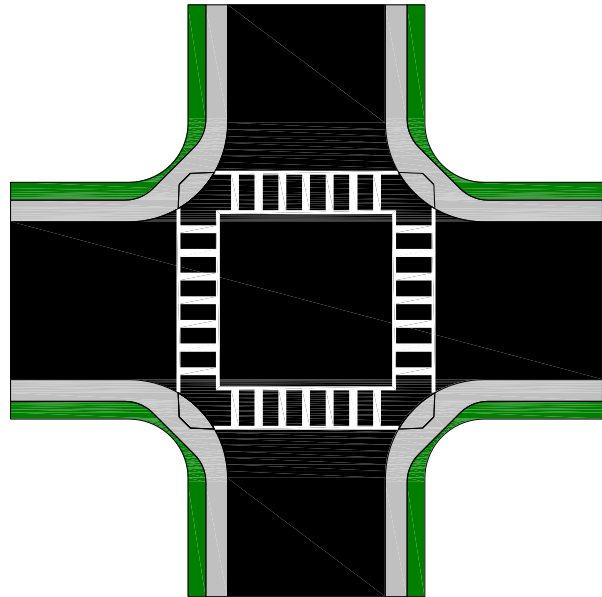
# High Visibility Crosswalks

### Description:

High visibility crosswalks established by painting stripes between the crosswalk's outer boundary stripes.

### Application:

High visibility crosswalks increase crosswalk visibility to drivers.



### Advantages:

- More visible to the driver than traditional crosswalks.

### Disadvantages:

- May give false sense of security to pedestrians.
- Higher maintenance costs.

### Special Considerations:

- Should only be considered at controlled intersections where painted crosswalks already exist.
- Pedestrians may place too high a reliance on its ability to control driver behavior.
- Can be used at high pedestrian volume crossing locations.

### Cost:

- \$1500 to \$7,000 each.

## Phase II

# Narrowing Lanes (Striping)

### Description:

Striping used to narrow traffic lanes. The "extra" pavement width can be used to create or add to bicycle and/or parking lanes. Lane striping can also be used to visually simulate the hardscape features that define the horizontal traffic calming measures found in Phase III.

### Application:

Narrowing lanes with striping used to help slow vehicle speeds. Horizontal measures can be simulated with striping but are not as effective as Phase III traffic calming measures that use hardscape to deflect traffic.

### Advantages:

- Can be quickly implemented in some circumstances.
- May reduce travel speeds.
- May improve safety.



### Disadvantages:

- Not effective as stand-alone measure.
- May lead to loss of parking.
- Increases regular maintenance.
- Some residents may oppose striping on neighborhood streets.
- Increases resurfacing costs.

### Special Considerations:

- Narrowed travel lanes create "friction" to help slow vehicle speeds.
- Can be installed quickly.
- Designated bicycle lanes and/or parking lanes can be created.
- Adds centerline and edgeline striping to neighborhood streets.

### Cost:

- \$0.75 per linear foot.



## Phase II

# Neighborhood Signs

### Description:

Neighborhood signs involve the use of special signs such as "ENTERING A TRAFFIC CALMED NEIGHBORHOOD" to increase motorist awareness.

### Application:

Neighborhood signs help reduce speeding on residential streets.



### Advantages:

- May increase driver awareness.
- May cause drivers to slow down.
- Low cost of installation.

### Disadvantages:

- May have no lasting effect.
- Can create false sense of security.
- Adds to sign clutter.
- Increased cost of sign maintenance.
- Not a standard MUTCD sign.

### Special Considerations:

- Installed at entry points to a neighborhood.

### Cost:

- \$\$200 per sign.

## Phase III

# Turn Restrictions via Signs

### Description:

Standard "No Left Turn", "No Right Turn", or "Do Not Enter" signs used to prevent undesired turning movements onto residential streets.

### Application:

Turn restriction signing used to reduce cut-through traffic on residential streets.



### Advantages:

- Redirects traffic to main streets.
- Reduces cut-through traffic.
- Low cost.

### Disadvantages:

- May divert traffic to other streets.
- Inconvenient to residents.
- Enforcement required.
- Adds to sign clutter.
- Violation rates can be high without enforcement.

### Special Considerations:

- Installed at entry points of a neighborhood to prevent traffic from entering.
- Has little or no effect on speeds for through vehicles.
- With active enforcement, violation rates can be reduced.

### Cost:

- \$200 per sign.



## Phase III

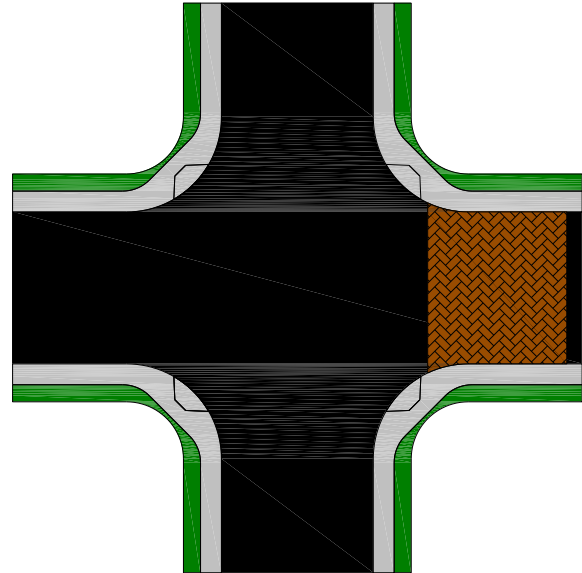
# Textured Pavement

### Description:

Textured pavement is installed in the roadway typically to provide an entry statement to the neighborhood.

### Application:

Used as a visual cue for drivers to slow down.



### Advantages:

- Aesthetic/visual enhancement.
- Provides entry statement to traffic calmed area.

### Disadvantages:

- Increase in maintenance.
- Increase in noise.
- Expensive.

### Special Considerations:

- Textured pavement has minimal influence on drivers routine behavior.
- Overall speeds and volumes are usually only minimally influenced.

### Cost:

- \$10 per square foot.

## Phase III

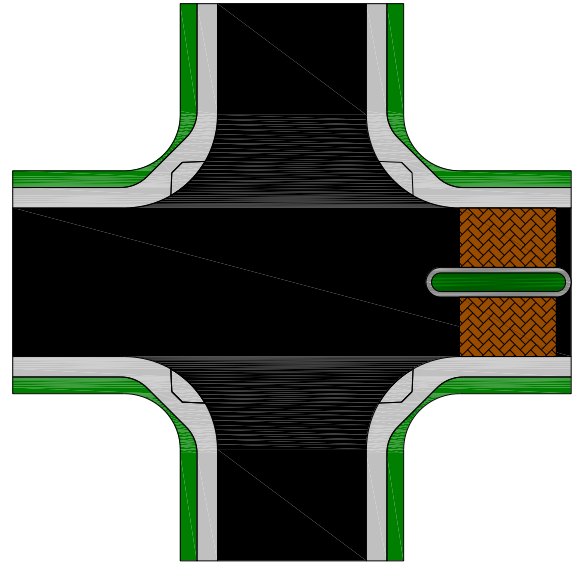
# Entry Treatment

### Description:

Entry treatments consist of raised landscaped median islands and textured pavement features and are located at entries to neighborhoods.

### Application:

Entry treatments help reduce speed. They provide visual cues to drivers they are entering a residential area or that surrounding land uses are changing.



### Advantages:

- May reduce vehicle speeds.
- Creates an identify for the neighborhood.
- May reduce cut-through traffic.
- Opportunity for landscaping.

### Disadvantages:

- Increase in noise.
- May require removal of parking.
- Can impede truck movements.
- Creates physical obstruction.
- Increase in maintenance.

### Special Considerations:

- Entry treatments have minimal influence on drivers routine behavior.
- Overall speeds and volumes are usually only minimally affected.
- Entry treatments make drivers more aware of the neighborhood environment.
- Care should be taken not to restrict pedestrian visibility at adjacent crosswalk.

### Cost:

- \$21,000 to \$35,000 per approach.

## Phase III

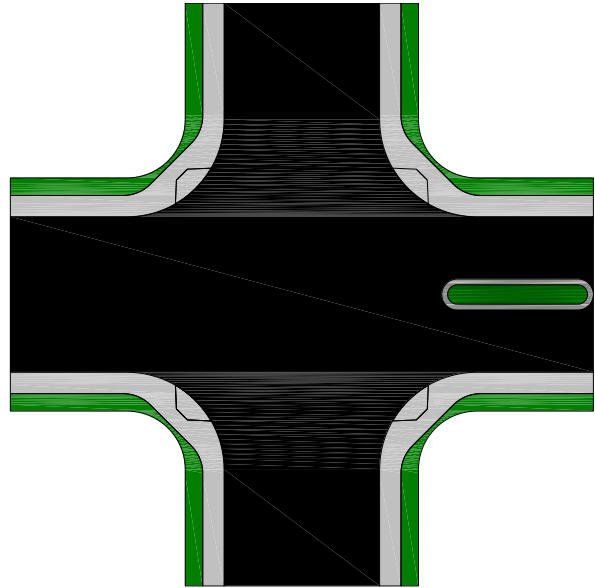
# Center Island Narrowing

### Description:

Center island narrowing is the construction of a raised island in the center of a wide street.

### Application:

Center islands are installed on wide streets to help lower speeds and/or to prohibit left-turning movements. They also provide a mid-point refuge area for pedestrians.



### Advantages:

- Reduces vehicle speeds.
- Can reduce vehicle conflicts.
- Reduces pedestrian crossing width.
- Landscaping opportunity.

### Disadvantages:

- May require parking removal.
- May reduce driveway access.
- May impact emergency vehicles.
- May divert traffic to other streets.

### Special Considerations:

- When used to block side street access, may divert traffic.
- May visually enhance the street with landscaping.
- Bicyclists prefer not to have travel way narrowed.

### Cost:

- \$14,000 to \$28,000 each.

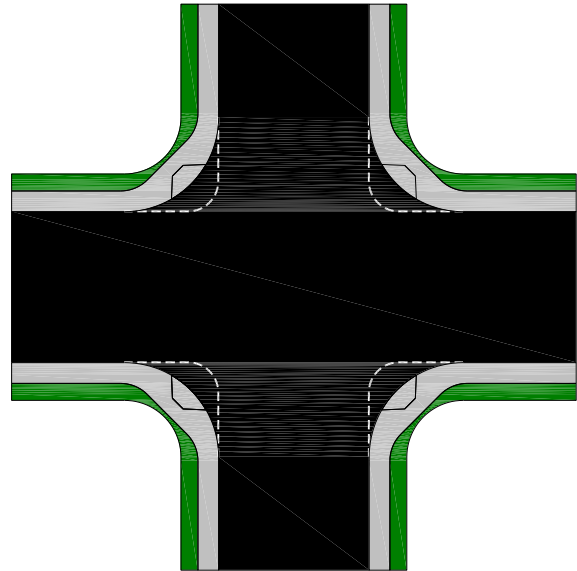
## Curb Radius Reduction

### Description:

Removal of existing larger radius curb returns at an intersection and construction of smaller radius curb returns.

### Application:

Curb radius reductions slow vehicle turning speeds and shorten pedestrian crossing distance.



### Advantages:

- Shorter pedestrian crossing width.
- Slower vehicle turning speeds.
- Opportunity for landscaping.

### Disadvantages:

- Impacts large vehicle turns.

### Special Considerations:

- Careful attention needs to be given to drainage issues and turning radii.

### Cost:

- \$12,000 to \$18,000 (four-leg intersection)

## Phase III

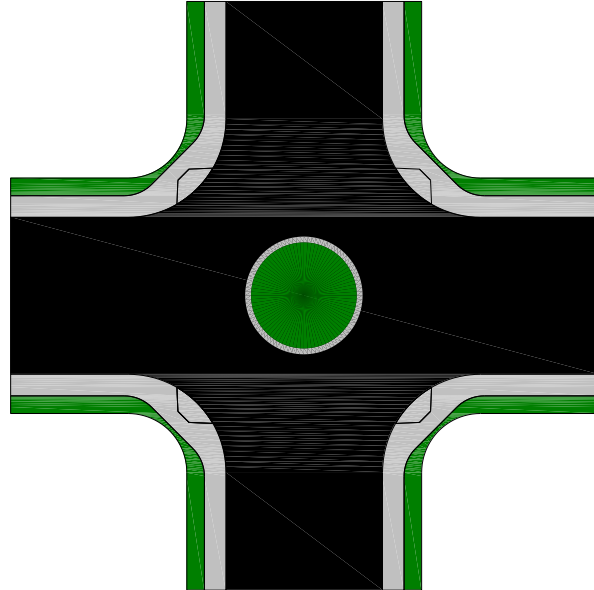
# Traffic Circle

### Description:

Traffic circles are raised circular islands installed in an existing intersection. Traffic circles require drivers to slow down to maneuver around the circle.

### Application:

Traffic circles provide speed control.



### Advantages:

- Effectively reduces vehicle speeds.
- Reduces collision potential.
- Better side-street access.
- Opportunity for landscaping.

### Disadvantages:

- May increase bicycle/automobile conflicts.
- Can increase emergency vehicle response time.
- Can restrict large vehicle access.
- Expensive.
- Some left-turning vehicles must negotiate circle clockwise.

### Special Considerations:

- Traffic circles are best used in a series or with other devices.
- About 30 feet of curbside parking must be prohibited in advance of circle.
- Requires the installation of signs and pavement markings.
- Traffic circles are less effective at T-intersections.

### Fire Department and Police Department Evaluation:

Fire Department and Police Department shall have final approval of traffic circle locations.

### Cost:

- \$20,000 to \$35,000 per intersection.

## Phase III

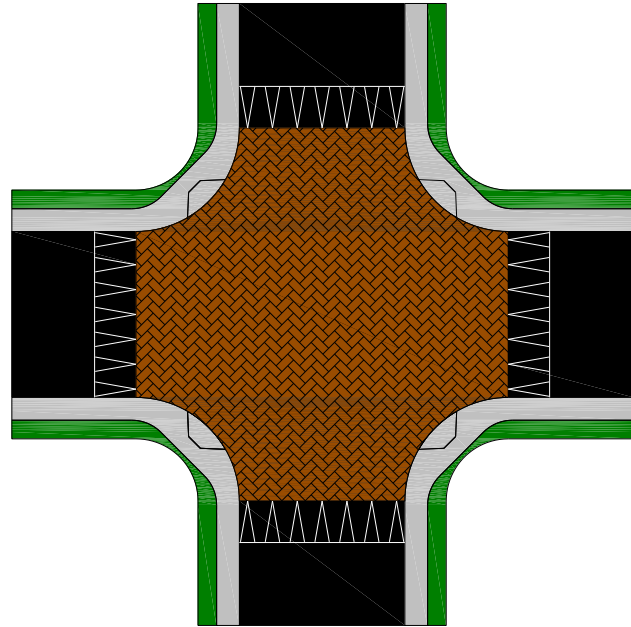
# Raised Intersection

### Description:

A raised intersection is a flat, raised area covering an entire intersection. There are ramps on all approaches. The plateau is generally about 4" high. Typically, the raised intersection is finished with textured pavement.

### Application:

Raised intersections reduce vehicle speeds and provide for safer pedestrian crossings.



### Advantages:

- Effectively reduces vehicle speeds.
- Enhances pedestrian safety.
- Can be aesthetically pleasing.

### Disadvantages:

- Expensive to construct and maintain.
- Requires drainage modifications.
- Affects emergency vehicle response time.
- May require bollards around corners.

### Special Considerations:

- Makes intersections more pedestrian-friendly.
- Special signing is required.

### Fire Department and Police Department Evaluation:

This measure is one of the least acceptable to the Fire Department and the Police Department and its use requires extensive evaluation of the specific location and impacts to emergency response times.

### Cost:

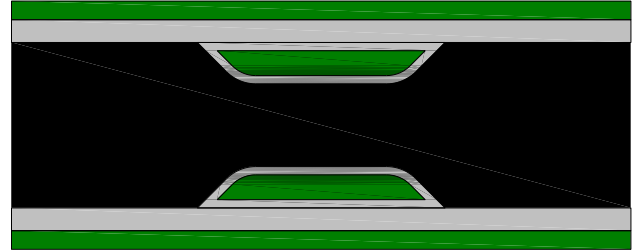
- \$48,000 to \$110,000 per intersection.

## Phase III

# Mid-Block Choker

### Description:

Mid-block chokers are curb extensions that narrow a street by extending the curbs towards the center of the roadway. The remaining street cross-section consists of two narrow lanes.



### Application:

Reduces speeds by narrowing the roadway so two vehicles can pass slowly in opposite directions.

### Advantages:

- Effectively reduces vehicle speeds.
- Shorter pedestrian crossing width.
- Improves sight distance.
- Opportunity for landscaping.

### Disadvantages:

- May require parking removal.
- May create hazard for bicyclists.
- May create drainage issues.
- May impede truck movements.
- May impact driveway access.

### Special Considerations:

- Preferred by many emergency response agencies to other measures.
- Provide excellent opportunities for landscaping.

### Cost:

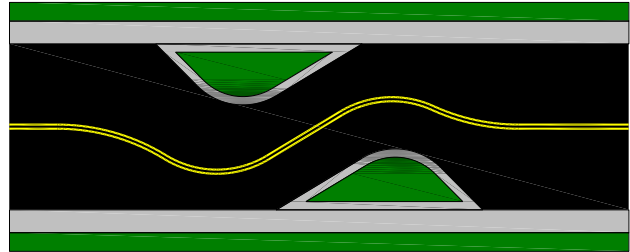
- \$14,000 per location

## Phase III

# Lateral Shift

### Description:

A lateral shift is the construction of curb extensions into the roadway that creates a horizontal deflection drivers must negotiate.



### Application:

A lateral shift helps reduce vehicle speeds.

### Advantages:

- Effectively reduces vehicle speeds.
- Low impact on emergency vehicles.
- Opportunity for landscaping.

### Disadvantages:

- Loss of parking.
- Increased maintenance.
- May impact driveways.
- May be expensive.

### Special Considerations:

- Most effective when traffic volumes are approximately equal in both directions.
- May increase conflicts with pedestrians and bicyclists.

### Cost:

- \$14,000 to \$28,000 per location.

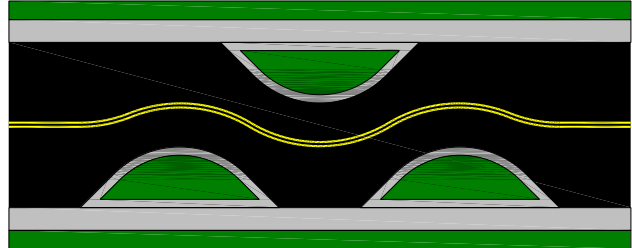


## Phase III

# Chicane

### Description:

A chicane is a series of two or more staggered curb extensions on alternating sides of a roadway. The horizontal deflection causes motorists to reduce speed.



### Application:

Chicanes help reduce vehicle speeds.

### Advantages:

- Effectively reduces vehicle speeds.
- Low impact on emergency vehicles.
- Opportunity for landscaping.

### Disadvantages:

- Loss of parking.
- Increased maintenance.
- May impact driveways.
- May be expensive.

### Special Considerations:

- May require removal of substantial amounts of on-street parking.
- Most effective when traffic volumes are approximately equal in both directions.
- May increase conflicts with pedestrians and bicyclists.
- Provide landscaping opportunities.
- Most residents would have their driveways affected.

### Cost:

- \$40,000 to \$80,000 per location.

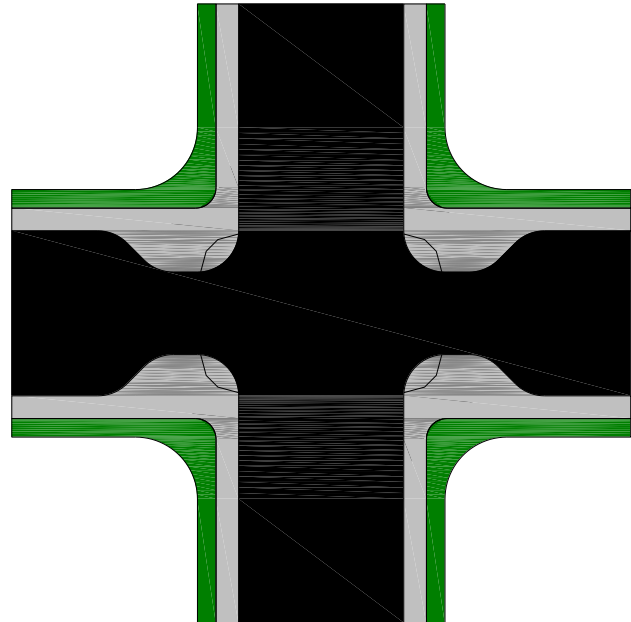
## Intersection Bulb-Out

### Description:

Intersection bulb-outs narrow the street by extending the curbs toward the center of the roadway.

### Application:

Used to narrow the roadway and to create shorter pedestrian crossings. They also influence driver behavior by changing the appearance of the street.



### Advantages:

- Improve pedestrian visibility.
- Shorter pedestrian crossing width.
- May reduce vehicle speeds.
- Opportunity for landscaping.

### Disadvantages:

- May require parking removal.
- May create hazard for bicyclists.
- May create drainage issues.
- Impacts large vehicle turns.

### Special Considerations:

- Intersection bulb-outs at transit stops enhance service.
- May require landscape maintenance to preserve sight distances.

### Fire Department Evaluation:

- Intersection Bulb-Outs shall be restricted to only one of the two intersecting streets.

### Cost:

- \$14,000 to \$28,000 (four-leg intersection).

## Phase III

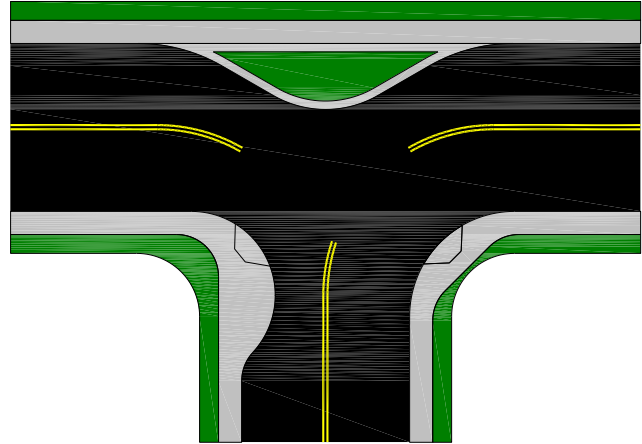
# Realigned Intersection

### Description:

"T" intersections are realigned/modified by constructing horizontal deflection which forces previous straight-through movements to make slower turning movements.

### Application:

Realigned intersections help reduce vehicle speeds.



### Advantages:

- Reduces vehicle speeds.
- No significant impact on emergency and transit service.
- May discourage through traffic.
- Opportunity for landscaping.

### Disadvantages:

- Removal of parking required.
- Increased maintenance.
- May divert traffic to other streets.

### Special Considerations:

- Reduces vehicle speeds near intersection.
- May change STOP sign configuration and affect emergency response times.
- Careful attention needs to be made to drainage issues.

### Cost:

- \$14,000 to \$28,000 each intersection.

## Phase III

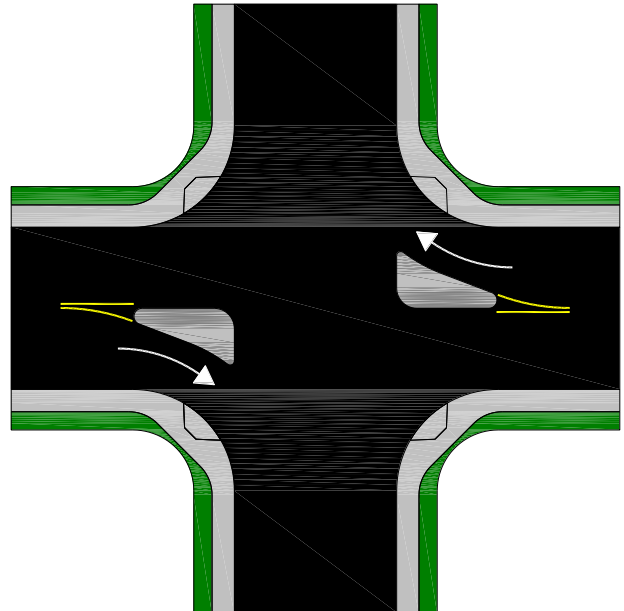
# Forced Turn Channelization

### Description:

Forced turn channelization are raised median islands that restrict specific movements at an intersection.

### Application:

Forced turn channelization reduces traffic volumes/cut-through traffic.



### Advantages:

- Reduces cut-through traffic.
- More self-enforcing than signs.
- Shorter pedestrian crossing distances.

### Disadvantages:

- May divert traffic to other streets.
- Can increase trip lengths.

### Special Considerations:

- Has little or no effect on speeds for through vehicles.
- In emergency situations, emergency vehicles can gain access.
- May increase emergency response times.

### Cost:

- \$7,000 to \$14,000 per approach.

## Phase III

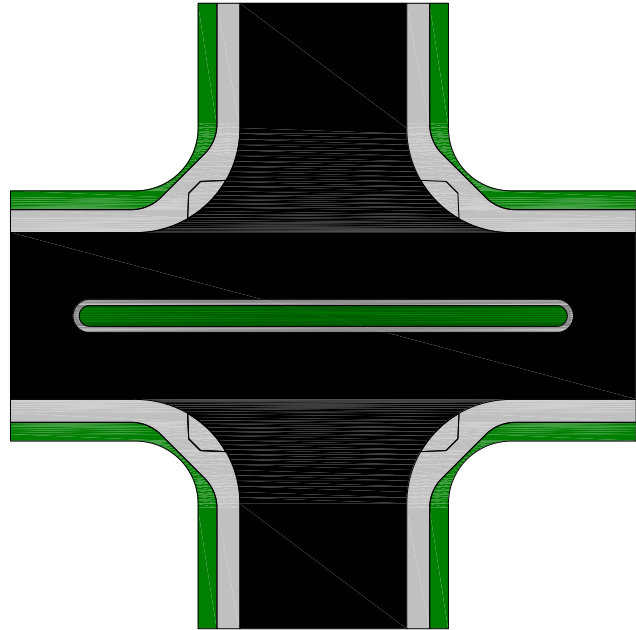
# Median Barrier

### Description:

Median barriers are raised islands constructed through intersections that prevent left turns and side street through movements.

### Application:

Median barriers reduce cut-through traffic.



### Advantages:

- Redirects traffic to other streets.
- Reduces cut-through traffic.
- Provides pedestrian refuge area.
- Opportunity for landscaping.

### Disadvantages:

- Redirects traffic to other streets.
- Increases trip lengths.
- May impact emergency response.
- Creates physical obstruction.

### Special Considerations:

- Should not be used on critical emergency response routes.
- Landscaping needs to be carefully designed to not restrict visibility for motorists, bicyclists and pedestrians.

### Fire Department and Police Department Evaluation:

This measure is one of the least acceptable to the Fire Department and Police Department; its use requires extensive evaluation of the specific location and impacts to emergency response times.

### Cost:

- \$14,000 to \$28,000 each.

## Phase III

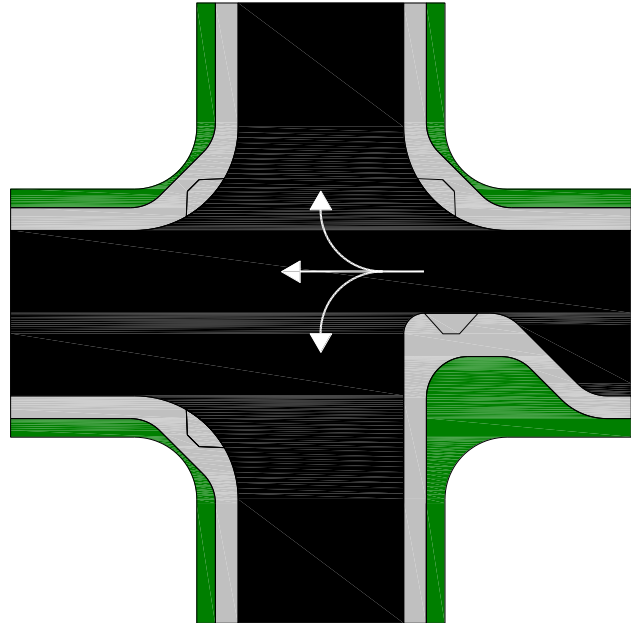
# Semi-Diverter

### Description:

Semi-diverters are curb extensions that restrict movements into a street. They are constructed to approximately the center of the street, obstructing one direction of traffic. A one-way segment is created at the intersection, while two-way traffic is maintained for the rest of the block.

### Application:

Semi-diverters reduce traffic volume.



### Advantages:

- Reduces cut-through traffic.
- More self-enforcing than signs.
- Reduces pedestrian crossing widths.
- Opportunity for landscaping.

### Disadvantages:

- May divert traffic to other streets.
- May increase trip lengths.
- May require the removal of parking.
- Increased maintenance.

### Special Considerations:

- Restricts access into street while allowing residents access within block.
- Potential use must consider how residents will gain access.
- In emergency situations, emergency vehicles can gain access.
- May increase emergency response times.

### Fire Department and Police Department Evaluation:

This measure is one of the least acceptable to the Fire Department and Police Department; its use requires extensive evaluation of the specific location and impacts to emergency response times.

### Cost:

- \$20,000 to \$28,000 each.

## Phase III

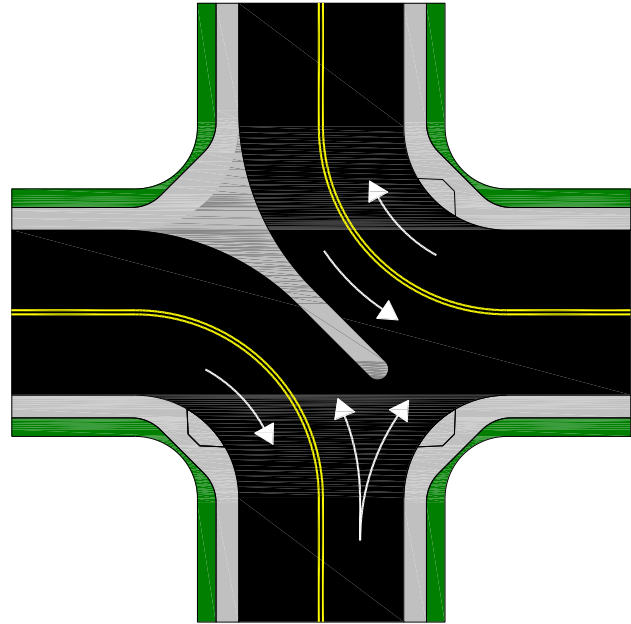
# Partial Diverter

### Description:

Partial diverters are raised areas placed diagonally across a four-legged intersection (3/4 closure). They prohibit through movements by creating two "L" shaped intersections, with one leg having a right turn.

### Application:

Partial diverters help reduce cut-through traffic. They also minimally decrease speeds near the intersection.



### Advantages:

- Reduces cut-through traffic.
- Minimal impact to emergency access.
- Reduces collision potential.
- Opportunity for landscaping.

### Disadvantages:

- Redirects traffic to other streets.
- May increase trip lengths.

### Special Considerations:

- Problem(s) may be shifted to other streets unless a comprehensive area plan is developed.
- Less impact to circulation than a full street closure.
- Can be attractively landscaped.

### Fire Department and Police Department Evaluation:

This measure is one of the least acceptable to the Fire Department and Police Department; its use requires extensive evaluation of the specific location and impacts to emergency response times.

### Cost:

- \$20,000 to \$48,000 each.

## Phase III

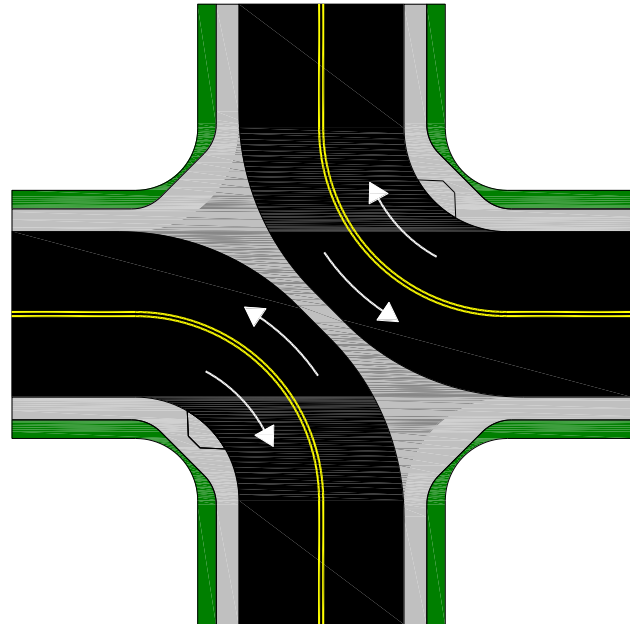
# Diagonal Diverter

### Description:

Diagonal diverters are raised areas placed diagonally across a four-legged intersection. They prohibit through movements by creating two "L" shaped intersections.

### Application:

Diagonal diverters reduce traffic volumes. They also minimally decrease speeds near the intersection.



### Advantages:

- Reduces cut-through traffic.
- Self-enforcing.
- Reduces vehicle conflicts.
- Opportunity for landscaping.

### Disadvantages:

- Increases out of direction travel.
- Increases trip lengths.
- Impedes emergency vehicles.

### Special Considerations:

- Can be designed to allow emergency vehicle access.
- Can be designed to allow pedestrian and bicycle access.
- Problem(s) may be shifted to other streets unless a comprehensive area plan is developed.
- Less impact to circulation than a full street closure.

### Fire Department and Police Department Evaluation:

This measure is one of the least acceptable to the Fire Department and Police Department; its use requires extensive evaluation of the specific location and impacts to emergency response times.

### Cost:

- \$25,000 to \$52,000 each.