CITY OF EL PASO, TEXAS
AGENDA ITEM DEPARTMENT HEAD'S SUMMARY FORM

DEPARTMENT: **Engineering, Traffic Division**

AGENDA DATE: **March 25, 2008**

CONTACT PERSON/PHONE: **Kimberly Forsyth, Senior Planner – 541-4165**
Ted Marquez, Asst. City Engineer – 541-4035

DISTRICT(S) AFFECTED: **City-wide**

SUBJECT:

Discussion and action on a resolution authorizing the City Council to adopt the Neighborhood Traffic Management Program, a copy of which is attached as Exhibit A, as the policy concerning the management of traffic within neighborhoods and that the Engineering Department be authorized to implement the process and procedures for the approval, design, installation and maintenance of traffic calming measures under the general guidelines contained in Exhibit A. The existing policy concerning "Guidelines for Speed Hump Installations" is hereby revoked.

BACKGROUND / DISCUSSION:

The City Council on Oct. 16, 2007 approved a professional service agreement with Kimley-Horn and Associates, Inc. to provide comprehensive planning and engineering services to evaluate and establish Neighborhood Traffic Management policies and procedures. The program will offer various traffic calming measures to be used on residential and collector streets where safety problems (such as speeding, high accident rates, failing to observe regulatory signs, and/or cut through traffic) have been identified.

In November 2007, the consultants and Traffic - Engineering Division staff conducted a series of meetings with residents in all 8 Districts to identify their major traffic problems and concerns. A meeting was also held with members of the real estate and development community in December 2007 to obtain their input. In January 2008, a City-wide public meeting was held to present the results of the district meetings. Additionally, the consultants have researched successful Neighborhood Traffic Management programs and tools that have been used in several other major cities.

This initiative ties in with and promotes "smart growth" principles and policy direction from City Council, and the staff have recommended alternative design standards to be incorporated into the subdivision code to allow traffic calming measures to be used in both new and existing developments as appropriate and desirable.

The consultants are presenting their findings, recommendations and various options for Neighborhood Traffic Management Program policies and procedures to the City Council. Attached is a manual that sets forth the program guidelines and a Citizen Guidebook that will be utilized in public outreach and education about the program.

PRIOR COUNCIL ACTION:

Approval of consultant contract in October 2007

AMOUNT AND SOURCE OF FUNDING:

2006 CO - 99331117-27263-508016	$169,000
2006 CO - 99331117-27263-508022	3,000
2006 CO - 99331117-27263-508027	828,000
Total	$1,000,000

BOARD / COMMISSION ACTION:

Presentations were made to the City Plan Commission on Feb. 28, 2008 and to the Transportation Legislative Review Committee of the City Council on Feb. 29, 2008. The LRC voted approval to move forward with the program, and directed staff to prepare an implementation plan within six months. The LRC also recommended that the City Council commit to ongoing funding for the program.

**********REQUIRED AUTHORIZATION**********

LEGAL: (if required) _____ **FINANCE:** (if required) _____

DEPARTMENT HEAD: R. Alan Shubert

APPROVED FOR AGENDA:

CITY MANAGER: _____ **DATE:** _____

CITY CLERK DEPT.
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RESOLUTION

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EL PASO:

That the City Council adopt the Neighborhood Traffic Management Program, a copy of which is attached as Exhibit A, as the policy concerning the management of traffic within neighborhoods and that the Engineering Department be authorized to implement the process and procedures for the approval, design, installation and maintenance of traffic calming measures under the general guidelines contained in Exhibit A. The existing policy concerning "Guidelines for Speed Hump Installations" is hereby revoked.

ADOPTED THIS _____ DAY OF _____, 2008.

THE CITY OF EL PASO

_____
John F. Cook
Mayor

ATTEST:

_____
Richarda Duffy Momsen
City Clerk

APPROVED AS TO FORM:

_____
Lupe Cuellar
Assistant City Attorney

APPROVED AS TO CONTENT:

_____
R. Alan Shubert, P.E., C.B.O.
City Engineer

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City of El Paso

Neighborhood Traffic Management Program

March 2008

Toolbox

Median Barrier

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

Approximate Cost: $15,000-20,000 per 100 feet

Measured Impacts

Volume Impacts – Reduction in vehicles per day = -31%

Source: Traffic Calming: State of the Practice, 2000

Advantages

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

Disadvantages

- Requires available street width on the major street
- Limits turns to and from the side street for local residents and emergency services

Acknowledgements

City of El Paso

Mayor
John Cook

City Council
Ann Morgan Lilly, District 1
Susannah M. Byrd, District 2
Vacant, District 3
Melina Castro, District 4
Rachel Quintana, District 5
Eddie Holguin Jr., District 6
Steve Ortega, District 7
Beto O'Rourke, District 8

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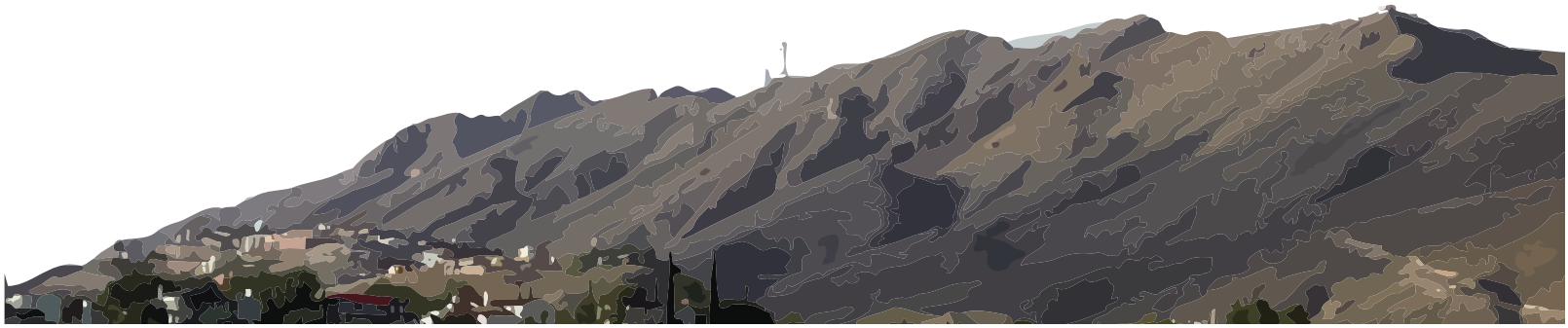


Chapter 1

Introduction to the Neighborhood Traffic Management Program

The City of El Paso's Neighborhood Traffic Management Program (NTMP) addresses concerns about safety, noise, and quality of life issues related to vehicle traffic on neighborhood streets. The NTMP includes a formal process for the implementation of traffic calming measures in El Paso neighborhoods and a toolbox of traffic calming measures. This manual documents the purpose of traffic calming, request process and design guidelines for the program. The first chapter outlines the purpose, elements of the program and recognizes how the program was created in 2007-2008 with the assistance of citizens, consultants and staff of the City of El Paso.

Purpose

The NTMP is designed to address the following neighborhood traffic problems:

Cut-Through Traffic — Cut-through traffic has neither its origin nor destination within a neighborhood, but rather is passing through a neighborhood on local streets. Traffic engineers intend that through traffic use major arterial streets, not neighborhood streets. Unfortunately, motorists often use neighborhood streets to shorten driving distances, avoid signals, or because they are more pleasant and therefore seem faster.

Speeding — Many motorists (neighborhood residents as well as "cut-throughs") drive too fast on local streets. While some speeding is done by irresponsible drivers, the majority is done by normally responsible drivers who find themselves "invited" to speed by the road's design features, such as excessively wide pavement, straight sections of road, and absence of vegetation. In addition to safety concerns, speeding vehicles degrade the quality of the street for all other users, giving the impression that the street is solely for the motorist and not a unifying element for the neighborhood.

Security — Excessive traffic speeds are a threat to neighborhood security and cause residents to retreat into their homes, essentially abandoning the street to vehicles. Reducing traffic speeds and volumes through traffic calming measures are powerful ways for residents to start to reclaim their streets.

Aesthetics — Wide expanses of pavement devoted solely to the movement of traffic and storm water dominate the landscape in El Paso. Traffic calming provides the opportunity to use streets not only for vehicular traffic but also as an aesthetically pleasing focal point for the community as well as a trap for storm water drainage.

Other Issues — Parking, arterial street access and performance; design of school zones; and transit stop locations were also recognized as isolated issues specific to some El Paso neighborhoods.

Elements

The problems of cut-through traffic, speeding, security, and aesthetics can be addressed in El Paso with a NTMP that utilizes the three "E's" — Education, Enforcement, and Engineering.

Education — Neighborhood traffic management studies have shown that often the residents themselves contribute to the perceived speeding problem within the neighborhood. Because of this fact, the most effective NTMPs use all three "E's" and begin with resident education about the need to obey speed limits and yield to pedestrians. Engineering measures alone will not produce satisfactory results.

Enforcement — Intensified enforcement of traffic regulations can calm traffic, generally by reminding drivers of posted speed limits and enforcing the observance of stop signs. Police officers are the usual source of intensified enforcement, but neighborhood volunteers can also prove effective in this area.

Engineering — Engineering solutions physically modify the roadway in some manner to encourage drivers to alter their behavior by reducing speed, raising awareness of pedestrians and bicyclists, or diverting traffic to a more appropriate street. These engineering solutions, are often intended to be "self-enforcing" and are performed after education and enforcement activities.

The success of the City of El Paso's NTMP will be measured by the usability of the initiative by the general public, and the ease of implementation for the City. The methodology used to define this program is based on listening to the needs of the citizens; understanding the concerns, constraints, and opportunities presented by staff, policy makers, and private developers; and designing a program that does not compromise on critical elements, but rather customizes the NTMP to the unique environmental, cultural, and political factors found in El Paso. The public workshops summarized below were the foundation for building a successful NTMP for the City of El Paso.

Public Workshops Summary

Over six days in November 2007, City of El Paso staff and consultants conducted public meetings in all eight council districts. The meetings were arranged through each respective council representatives' staff and held in central locations open to the public. Accommodations were made for persons with disabilities. Materials were made available in Spanish, and Spanish language translators were available.

Each meeting began with a background presentation on national best practices of neighborhood traffic management programs and an overview of existing conditions.

Attendees were then encouraged to participate in a workshop to identify streets in their neighborhood that are experiencing traffic issues such as speeding, congestion, and stop control running. On a base map of their council district, participants used red dots to indicate traffic safety issues and blue dots for cut-though traffic. (A compilation map created for each district is provided in the appendix.)

Participants also reviewed the proposed traffic calming measures for consistency with their neighborhood goals.

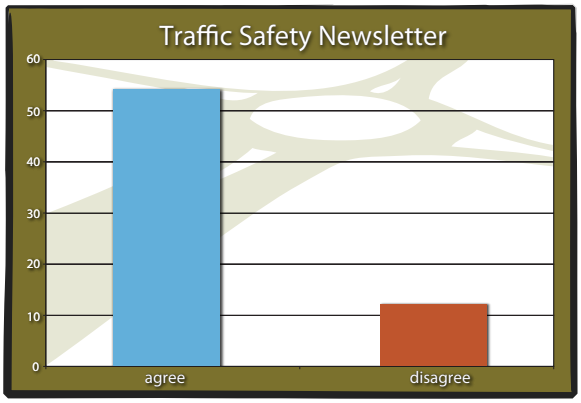
Finally, participants were invited to share their group's findings with the entire audience. New ideas were often spawned from this interaction and revisions were made to previous group decisions.

Public Workshops Summary

Using a questionnaire, participants provided feedback on key elements proposed for the NTMP. Elements such as creation of a traffic safety newsletter and a neighborhood speed reduction programs were seen in a positive light.

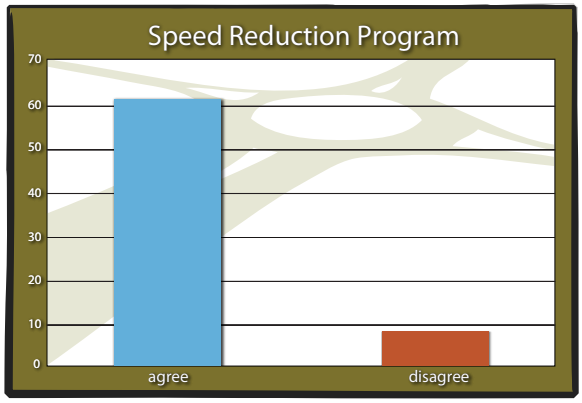
Neighborhood Traffic Safety Newsletters

This document contains information about a neighborhood's safety concerns, explains the results of the City's Traffic Division speed and volume studies, and recommends "traffic calming" measures — ways to slow traffic in a neighborhood. In addition, traffic and pedestrian safety basics are covered.



Neighborhood Speed Reduction Program

This neighborhood-sponsored program empowers residents to decrease speeds in their own community through the use of informational signs and "pace cars," in which residents pledge to drive responsibly and the posted speed limit, setting the pace for cars behind them.



Public Workshops Summary

Consultants and staff also participated in "walking, driving, and front yard meetings" of communities with special needs.

The public workshops and walking and driving tours were supplemented with a meeting between City staff, consultants, and the development community, which was facilitated by the Greater El Paso Association of Realtors. This meeting focused on how to design new developments with neighborhood traffic management as a goal. The culmination of examining the existing conditions through field observations, traffic data review and public interaction provided staff and consultants with questions that could be posed to other communities that have faced these issues in the past. The next section examines the national best practices in neighborhood traffic management.

Final Public Meeting

A final public meeting was conducted on January 18, 2008. The meeting introduced the program parameters and asked for participants input on how to fund the program and what projects should be prioritized first. The over 100 attendees were afforded time to ask questions of consultants and staff and complete a

"You guys now have a greater understanding of my neighborhood's traffic calming needs."

– Major William F. Hart, Jr.

"I really appreciate the time spent by the consultants in our neighborhood."

– Steven M. Curl
Manhattan Heights Association

Chapter 2

Neighborhood Traffic Management Program Options

Will traffic calming work on my neighborhood?

Traffic calming can work in any local or collector street level street. The program is not appropriate for arterial streets deigned for higher traffic volumes and speeds. The El Paso functional classification system defines the streets that traffic calming may be applied to.

Neighborhoods that are organized, active and motivated are most likely to design and carry out the NTMP. Communities with a capacity to develop plans for the future and work together to carry them out are most likely to find and solve neighborhood traffic issues. Therefore, the NTMP is best accomplished working with neighborhoods in an area that shares roads and boundaries. This is often defined as a space – preferably one square mile or less – between geographic and major road boundaries. Depending on the issues and level of community involvement, it could take one to two years to develop and implement a neighborhood traffic management plan.

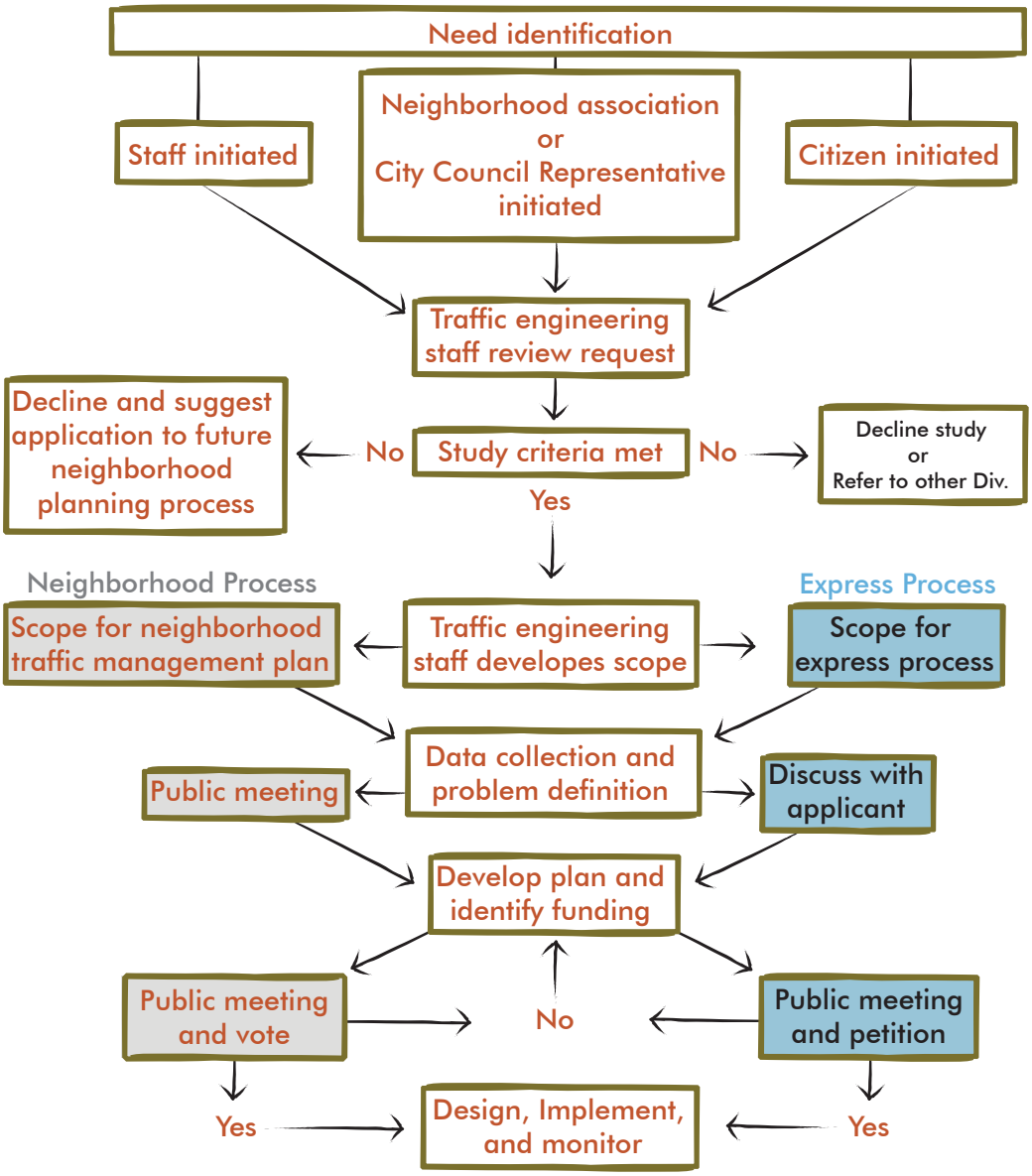
Some neighborhood traffic concerns need more immediate attention and require a more flexible process than the neighborhood approach. For these reasons this manual also includes "Express" methods to perform temporary traffic calming measures. The following chapter details the process for both the Express and Neighborhood processes.

NTMP Options

The NTMP Process

The NTMP is a three-level program with two options for implementing the program. The "express" process is available to address traffic situations that need immediate attention. This process requires less citizen participation, therefore less time to implement, but results may not be in keeping with neighborhood values and desires. The "neighborhood" process is a comprehensive approach to solving traffic issues at a scale larger than a single street. Typically, this process will study an area of less than a square mile and will require extensive citizen participation in devising solutions to traffic issues.

Most NTMP requests will begin with the "express" process. The "neighborhood" process can be requested, or staff may recommend it based upon the complexity of the issues defined and the time frame needed to resolve them. The chart below describes the general flow of a NTMP request.



NTMP Options

Level I "Express" Non-Physical Measures

Level I "Express" measures include education and enforcement initiatives. They also include engineering measures that are relatively low in cost and simple in their implementation. These engineering measures could be signing, striping, curb marking, changes in signal timing, and improvement in street lighting as listed below.

- Educational programs
- Targeted police enforcement
- Regulatory signs
  - Truck restriction signs
  - Parking prohibition signs
- Static warning and specialty signs
  - High visibility signs
  - Pedestrian Crossing signs
  - Neighborhood information signs
- Special striping and markings
  - Reduced lane width/edge line
  - Marking of street narrowing features
  - High visibility crosswalks
  - Yellow curbs
- Dynamic speed signs
- Radar speed trailer
- Addition or removal of turn lanes

Purpose – Response to individual complaints or other's observations

Request process – Individual, no petition needed

Study – Visual inspection during peak time. Traffic counts if needed.

Implementation and Monitoring – Measures can be implemented using permanent or temporary traffic calming measures. If temporary measures are selected, they should be installed and monitored for a period of three to six months.

Project prioritization – First-come, first-serve basis.

NTMP Options

Level II Express Physical Measures

Level II includes all measures included in Level I and adds physical measures aimed at narrowing and providing horizontal deflection to the roadway. The express physical measure program is designed to address speeding and cut-through traffic on singular local or collector streets and/or blocks prior to a neighborhood traffic management plan being completed. These measures may be temporary and can be removed at the discretion of the City Traffic Engineer in the following situations:

- To mitigate an unforeseen safety concern.
- To mitigate an unacceptable diversion of traffic
- After the completion of a neighborhood traffic management plan recommends alternative measures

PRIORITY RANKING GUIDELINES

Measure	Definition	Points
Speeding	Average daily percentage of vehicles traveling more than 5 mph over the speed limit. One point for each percentage point over 5 MPH, and a second point for each percentage point over 10 MPH.	0-40
Volume	Average daily traffic volume, divided by 100.	0-30
Accidents	Number of reported, correctable accidents on the project street in the last three years.	5 each
Bike/Transit Routes	Street designated as Official or Unofficial Bicycle Routes on the Arlington County Bikeways Map, or used as a regular transit route by Metro Bus.	5 each
Pedestrian Generators	Public and private facilities on or near the project street, such as schools, parks, community houses, senior housing, etc., which generate a substantial amount of pedestrian traffic.	5 each
Dangerous Conditions	Conditions on the project street which lead to increased hazards, such as the absence of a sidewalk on either side of the street or inadequate, uncorrectable site distance problems.	5 each
Community Support	Support from civic association or local PTA; each ten percentage points above required 60% on qualifying petitions/cards.	5 each

Purpose – Response to individual complaints block or street–long complaints, or other's observations

Request process – Petition of two-thirds of households on block or street

Study – Speed and volume traffic counts and visual inspection

Implementation and Monitoring – Measures can be implemented using permanent or temporary traffic calming measures. If temporary measures are selected, they should be installed and monitored for a period of three to six months.

Project prioritization –Request are prioritized twice per year based-upon the adjacent project selection criteria. Applicants will be provided a date for which they will be informed of their project ranking.

NTMP Options

All of the following criteria must be satisfied for a street to be considered eligible for Express Physical Measure installation.

1. Petition

A petition that documents that a minimum of two-thirds of the residential households on the street support its installation.

2. Location Of The Street

The uses on the street where the physical measure is proposed must be composed primarily of low density residential dwellings.

3. Operational Characteristics Of The Street

a. The street must be used to provide access to abutting residential properties (local residential street) and/ or to collect traffic for such streets (residential collector).
b. There must be no more than one moving lane of traffic in each direction.
c. Traffic volumes must be more than 1,000 vehicles per day but less than 7,500 vehicles per day.
d. Vehicle speeds must equal or exceed the Speed Criteria of 35 miles per hour (mph).
e. The street must not be an identified primary route for emergency vehicles; this refers to a route that is heavily used due to the proximity of the emergency vehicle facility. These routes are subject to change.
f. The street must have a speed limit of 30-35 mph as determined in accordance with State Law.

4. Geometric Characteristics Of The Street

a. The street must have adequate sight distances to safely accommodate the traffic calming device.
b. The street must not have curves or grades that prevent safe placement of devices. Traffic calming devices may be located on streets that contain curves and/or grades, but the device itself must not be located within a horizontal curve, on a vertical grade greater that 8% or on their immediate approaches.
c. The street must be paved. It there are no curbs, a special design must be used to prevent vehicle run-arounds.
d. The elevation of property adjacent to a physical measure location must be above top of curb to minimize potential flooding due to the presence of the traffic calming device in the roadway.

NTMP Options

5. Cost Responsibility

The cost for the Express Physical Measure installation (including signs, pavement markings and, if necessary, special design features such as curbing or guard rail) may be shared between the City and residents according to how much the measured speed on the street exceeds the Speed Limit. This cost sharing is defined as follows:

Cost Sharing Table

85th PERCENTILE SPEED	RESIDENTS' COST SHARE
5 mph over	100%
6 mph over	80%
7 mph over	60%
8 mph over	40%
9 mph over	20%
>10 mph over	0%

For a street located in a Community Development Block Grant (CDBG) area, the cost responsibility of the residents is 0%, regardless of the measured speed. The cost for transportation engineering studies and maintenance of the traffic calming device is the responsibility of the City. The term resident, when used in cost sharing, does not necessarily refer to the petitioners. It is used to define the share of the cost that is not the responsibility of the City and could be paid by one or more of the residents or from other private sources. Notwithstanding the provisions of the foregoing cost sharing table, residents may be able to expedite traffic calming devices installation by voluntarily paying the full installation cost.

NTMP Options

Level III Neighborhood Traffic Management Plan

A Neighborhood Traffic Management Plan project uses education, enforcement and engineering to reduce vehicle speeds and to mitigate the negative impacts of vehicular traffic in neighborhoods. Level III is most effective at traffic calming because it is part of an overall strategy which extends within an entire neighborhood. The aim is to control traffic over an area, not at an isolated site, and for the traffic calming devices to be compatible with street activities and adjacent land uses. Level III begins with all of the "Express" Non-Physical Measures and "Express" Physical Measures. It also includes all the physical measures outlined in the toolbox and provides for alternative funding mechanisms not available to Level 1 or II applicants.

Purpose – A comprehensive approach to neighborhood traffic management

Request process – Neighborhood Association Petition, Council Representative Commitment or staff initiated

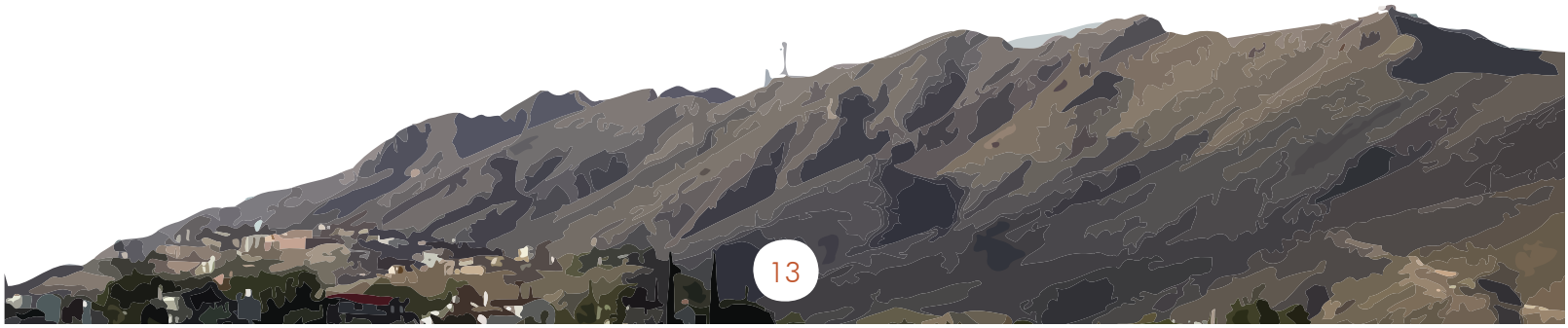
Study – Speed and volume traffic counts, visual inspection, simulations, and photo morphing.

Implementation and Monitoring – Measures must be implemented using permanent traffic calming measures. Monitoring should be done within three to six months of installation.

Process for Selecting a Neighborhood

For a neighborhood to be included in the NTMP, a resident must complete the NTMP Request Form which includes questions about the neighborhood boundaries, traffic issues that concern residents in the neighborhood, and a petition. Ten residents at least 18 years of age and from separate households within the neighborhood boundaries described in the NTMP Request Form must sign the petition. The completed form/petition must be submitted to the Engineering Department, Traffic Division/NTMP.

On an annual basis a call for projects will be announced to the community. The call for projects will have a sixty-day filing period to provide an equal opportunity for all interested residents to submit their completed form. At the close of the filing period, a selection criteria will determine the order of applicants. the Traffic Division will continuously accept NTMP Request Forms after the initial filing period, but will not rank them until the following year.



NTMP Options

Getting the Process Started

The Traffic Division kicks off the NTMP in each selected area (Level III) by inviting residents to learn more about the program at a community meeting. At this meeting, interested residents can volunteer to participate on the Traffic Calming Committee (TCC) for their neighborhood. Although all residents provide input and receive updates as the plan develops, the TCC is more actively involved, committing the time and effort necessary to develop a comprehensive plan.

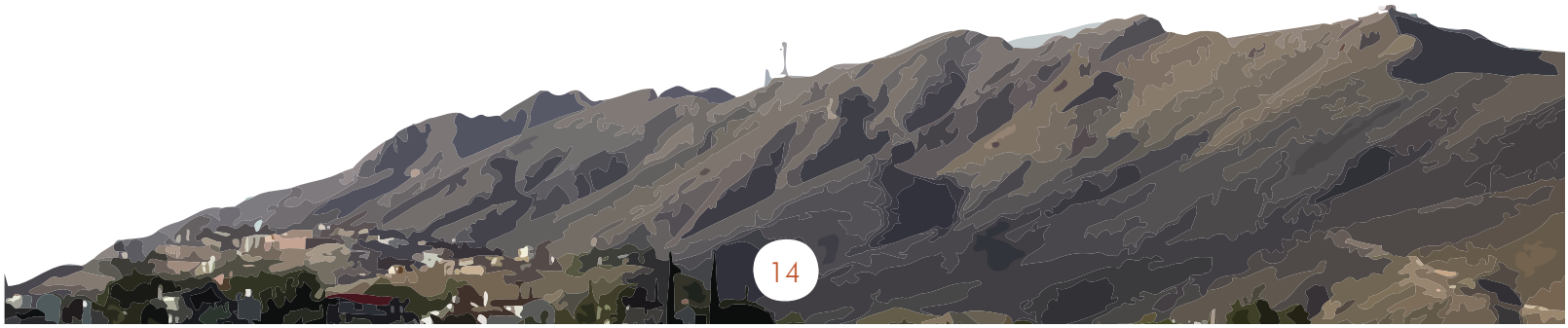
The TCC must secure the following assurances to begin the process:

- A minimum of three residents over the age of 18 commit to serve on the committee for a period of two years and meet at least quarterly.
- Designate an alternate for circumstances that require the committee member to be absent.
- Establish contact and invite School District representatives to be active in the committee and plan.
- Distribute information as provided by the Traffic Division Staff to all persons in study area (i.e. program guidelines, newsletters, petitions and pledges.)
- Upon completion of the study the TCC must facilitate a vote of the residents in the study area. This vote determines if the plan will be considered by the city council for adoption and funding. The vote requires a minimum of 50 percent of all the ballots be returned with a simple majority in favor of the plan. Every household and business is allowed one vote.

Developing the Neighborhood Traffic Management Plan

All neighborhoods begin by developing a Neighborhood Traffic Management Plan aimed at changing driver behavior through using the three "E"s of Education, Enforcement and Engineering introduced in the first chapter. Quarterly meetings between the TCC and Traffic Division are essential to this plan and should cover the following topics:

- Organize neighborhood outreach and information distribution
- Identify specific traffic concerns at a community meeting
- Establish goals for calming neighborhood traffic
- Target potential measures
- Consider transit needs if applicable
- Develop a Draft Neighborhood Traffic Management Plan that has broad consensus of the TCC
- Present the plan to the neighborhood at a community meeting
- Refine the plan based upon community input and finalize



NTMP Implementation

Two-Step Voting Process

Step 1. All neighborhood residents and businesses have the opportunity to vote whether Neighborhood Traffic Management Plan will be implemented. To proceed, a minimum of 50 percent of all ballots distributed in the study area must be returned with a simple majority in favor of the plan. Every household and business is allowed one vote.

Step 2. If the community supports the plan through the vote, a multi-disciplinary City of El Paso staff review will be completed within 120 days. The plan is then presented to the City Council for final approval.

Monitoring

Once the plan is implemented, a monitoring period of three to six months begins. Visual inspection of the area during peak travel periods must be completed by the Traffic Engineer and representative of the TCC. Traffic counts and speed studies should be performed during the same period.

Evaluating the Neighborhood Traffic Management Plan
After the monitoring period, the City Traffic Engineer evaluates the effectiveness of the traffic calming plan and presents the results to the TCC. If traffic calming measures have met the TCC's goals, a final report is then provided to neighborhood residents. If the TCC's goals have not been met, they are asked whether to refine the plan or to move into another phase that would consider traffic diversion devices such as road closures.

Level III Neighborhood Traffic Management Plan – Phase II

If the monitoring period of Level III NTMP reveals that speeding and cut-through traffic have not been reduced, the neighborhood may consider a second phase. Before Phase II can be considered, 50 percent of all residents and property owners must vote in favor with a simple majority to proceed with traffic calming measures designed to explicitly divert traffic,

The TCC would reconvene and the same process would be used to update the plan as was described in Level III Neighborhood Traffic Management Plan. The revised plan would be subject to community vote at which all neighborhood residents, businesses, and property owners (one per address, apartment unit, business, or property owner with the neighborhood who is a non-resident) have an opportunity to vote whether a Phase II plan will be implemented. To proceed, a minimum of 50 percent of all ballots must be returned and 66 2/3 percent of those received must be in favor of the plan. If supported by the vote, the plan must then be approved by the City Council.

Chapter 3

Neighborhood Traffic Management Program Implementation

What traffic calming tools will work in my neighborhood?

Level III Neighborhood Traffic Management programs will vary by geographic location and the individuals involved in the Traffic Calming Committee (TCC). This chapter defines a process that should be used by the TCC to determine the education, enforcement and engineering techniques that will be successful in the neighborhood. By clearly identifying traffic problems, setting goals and objectives, and selecting appropriate traffic calming measures to meet those goals and objectives, a TCC can develop a neighborhood traffic management plan that has a greater likelihood of being approved and of meeting its goals.

NTMP Implementation

Characterizing the Problem and Its Environment

The first step in developing a traffic calming plan is to characterize the problem type and to gather information about other conditions present at the problem location. This is accomplished through three tasks:

- Neighborhood traffic problems are identified and documented by the TCC
- Characterize Problem and detail its location(s)
- Collecting quantitative data and characterizing physical and environmental conditions

Neighborhood Input

Resident input must be used to determine whether the primary concern is one of vehicle safety, pedestrian safety, congestion, noise, inconvenience, or something else entirely. This can be accomplished by input from the NTMP request form and from verbal and written communication from the public. At the first meeting of the TTC members should compile all complaints into a single memo to be provided to the Traffic Division.

Characterizing Problem Details

When the primary problem type is determined, the details of the problem need to be characterized: exactly where does it occur, and at what times of day and days of week? Is there a traffic control device (such as all-way stop control at an intersection) that does not seem to work? This type of detail should be accounted for by conducting walking or driving audits of the area by at least one member of the TTC and the Traffic Division. This detail will give more direction to what quantitative data needs to be collected.

Collecting Data

Knowing the exact nature of the problem, the next step is to collect relevant information about the problem and its environment. See the sidebar "Types of Traffic Data" for some examples.

Setting Goals and Objectives

Before selecting traffic calming devices, the TCC should have some idea of their desired outcome. Goals should also be stated to express in qualitative terms, the kind of neighborhood the TCC members desire. Quantitative objectives should be set for each traffic problem to help assess the success of the traffic calming plan in solving the problems. There are no common or regulatory standards for setting these objectives. Consequently, the objectives should be seen simply as rough yardsticks of success in reviewing the installed plan.

TYPES OF TRAFFIC DATA:

- Roadway Geometry: Street widths, block lengths, and locations of stop signs and traffic signals.
- Roadway Users: Traffic volumes during peak hours, the entire day, and any particular periods when the problem occurs; pedestrian and bicycle volumes; truck volumes; bus routes; designation as a primary emergency response route; and origin-destination studies.
- Vehicle Performance Data: travel speeds, stop sign violations, rates of unsafe driving practices (e.g. cutting corners or crossing the centerline), and collision records.

NTMP Implementation

Selecting Measures

The first task in developing solutions to the traffic problems is to narrow the toolbox of traffic calming measures to those that will most closely target the key traffic issue, those that are appropriate for the type of location concerned, and those that are compatible with the traffic volumes, geometrics, and adjacent land uses at that location. When the list has been narrowed, devices should be considered that balance effectiveness and likelihood of acceptance. Finally, the selected devices need to be placed in a manner that will produce the desired results.

Selecting Measures for the Problem Type

The first task when selecting the most appropriate traffic calming device is to narrow the field of devices to those that address the primary traffic problem. The major types of problems that result in a desire for traffic calming are:

- Speeding – motor vehicle speeds are too high
- Traffic Volumes – motor vehicle usage levels (all trips or non-local trips only) are too high
- Vehicle Safety – motor vehicles have an inordinate level of risk
- Pedestrian Safety – motor vehicles cause an unnecessary risk to pedestrians
- Noise/Vibration/Air Pollution – motor vehicles cause excessive levels of these environmental effects

Each device in the toolbox is appropriate to a different subset of the above problem types. The appropriateness of each device is summarized in table 3.1 below.

Types of Measures	Type of Problem				
	Speeding	Traffic Volume	Vehicle Accidents	Pedestrian Safety	Noise
Level I Non-Physical Measures					
Targeted Speed Enforcement	★	○	●	●	●
Radar Trailer	★	○	○	○	●
Speed Feedback Signs	★	○	○	○	●
Edgeline / Centerline Striping	●	○	○	○	○
Optical Speed Bars	●	○	○	○	○
Speed Limit Signage	★	○	○	○	○
Speed Legends	★	○	○	○	○
Truck Restriction Signs	○	●	○	○	★
"Cross Traffic Does Not Stop" Signage	○	○	★	●	○
Raised Pavement Markers	○	○	★	●	○
High-Visibility Crosswalks	●	○	○	★	○
Angled Parking	★	●	○	○	○
Level II Narrowing Measures					
Bulbouts	★	○	○	★	○
Two-Lane Chokers	★	○	○	○	○
Center Island Narrowings / Pedestrian Refuges	★	○		★	○
Level II Horizontal Measures					
Traffic Circles	★	●	★	●	○
Roundabouts (Single-Lane)	●	●	★	○	★
Lateral Shifts	●	●	○	○	○
Chicanes	★	●	○	○	○
Speed Table	★	●	X	●	X
Speed Hump	●	●	X	X	X
Level III Measures					
Full Closures	★	★	○	○	○
Half Closures	★	★	○	○	○
Diagonal Diverters	★	★	○	○	○
Median Barriers	○	★	○	○	○
Forced Turn Islands	○	★	●	○	○

Key: ★ = Strongly Appropriate; ● = Moderately Appropriate; X = Inappropriate/Counterproductive; ○ = Indifferent

NTMP Implementation

Selecting Measures for the Location Type

Identification of appropriate traffic calming measures should start by determining which measures are applicable to the location of the problem. If the traffic problem is confined to a specific roadway segment, then only measures applicable to roadway segments can be considered. Some other measures can be considered at intersections. Furthermore, certain types of devices are appropriate in residential areas but not in non-residential areas. Table 3.2 indicates the location(s) where each traffic calming measure is applicable.

Types of Measures	Residential			Non-Residential	
	Midblock	Intersection	Boundary of Area	Midblock	Intersection
Phase I Non-Physical Measures					
Targeted Speed Enforcement	●	●	●	●	●
Radar Trailer	●	●	●	●	●
Speed Feedback Signs	●	●	●	●	●
Edgeline / Centerline Striping	●	X	X	●	X
Optical Speed Bars	●	X	X	●	X
Speed Limit Signage	●	●	●	●	●
Speed Legends	●	●	●	●	●
Truck Restriction Signs	X	X	●	X	●
"Cross Traffic Does Not Stop" Signage	X	○	●	X	○
Botts Dots / Raised Reflectors	On Curves	X	X	●	X
High-Visibility Crosswalks	●	Unsignalized Intersections	Unsignalized Intersections	●	Unsignalized Intersections
Angled Parking	●	X	X	●	X
Phase II Narrowing Measures					
Bulbouts	X	●	●	X	●
Two-Lane Chokers	●	X	X	●	X
Center Island Narrowings / Pedestrian Refuges	●	●	●	●	●
Speed Table	○	X	●	●	X
Speed Hump	○	X	●	●	X
Phase II Horizontal Measures					
Mini-Roundabouts	X	●	○	X	○
Roundabouts (Single-Lane)	X	○	○	X	●
Lateral Shifts	●	X	X	●	X
Chicanes	●	X	X	●	X
Phase III Measures					
Full Closures	X	●	●	X	X
Half Closures	X	●	●	X	X
Diagonal Diverters	X	●	X	X	X
Median Barriers	X	○	●	X	X
Forced Turn Islands	X	○	●	X	●

Key: ● = Generally Applicable; X = Seldom or never applicable; ○ = Not applicable except in some cases

NTMP Implementation

Selecting Measures for the Street Environment

The last step in narrowing the field of devices requires finding which devices are compatible with the traffic volumes, posted speeds, and special roadway users at the proposed location. For example, many devices have an upper boundary of traffic volumes beyond which any greater volume could result in traffic congestion that might be perceived as worse than the original traffic problem.

Also, since most devices cause some delay for emergency vehicles and transit buses, only certain devices can be used on primary emergency response routes and transit routes. Some measures have additional restrictions, such as hills, curves and bicycle routes that must be considered. Table 3.3 and 3.4 summarizes the constraints on the use of traffic calming devices in these various environments.

Types of Measures	Roadway Classification: Local Streets	Roadway Classification: Non-Residential Collectors	Roadway Classification: Residential Collectors	Bus Route	Other Considerations
Phase I Non-Physical Measures[1]					
Targeted Speed Enforcement	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph			OK	(None)
Radar Trailer					
Speed Feedback Signs					
Edgeline / Centerline Striping					
Optical Speed Bars					
Signage					
Speed Legend					
Truck Restriction Signs					
Center Line of Edge Line Botts Dots					
Botts Dots / Raised Reflectors					
High-Visibility Crosswalk					
Angled Parking	ADT 1,000 - 7,500 Width ≥ 48 feet; Speed Limit ≤ 35 mph			No	Not used with bike lanes
Phase II Narrowing Measures[1]					
Bulbouts	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph			OK	
Two-Lane Chokers	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph				
Center Island Narrowings / Pedestrian Refuges	No	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph			On bike routes, design with clear bike accomodations
Phase II Horizontal Measures[1]					
Mini-Roundabouts	Daily Entering Volume < 7,500; Speed Limit ≤ 35 mph	May be required at intersections where residential collector streets intersect with local streets		No	Grades ≤ 10%
Roundabouts (Single-Lane)	Daily Entering Volume < 20,000; Speed Limit ≤ 45 mph			Must design inscribed radius to be 100+ feet	Grades ≤ 6%; On bike routes, design with clear bike accomodations
Lateral Shifts	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph			OK	Grades ≤ 10%
Chicanes	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph				Grades ≤ 10%
Speed Table	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph				Grades ≤ 10%
Speed Hump	ADT 1,000 - 7,500; Speed Limit ≤ 35 mph			No	Grades ≤ 10%

Notes: [1]Traffic Calming devices are suitable for existing and new streets

Types of Measures	Roadway Classification: Local Streets	Roadway Classification: Collectors	Bus Route	Other Considerations
Phase III Restrictive Measures				
Full Closures	ADT 1,000 - 7,500; > 25% Non-Local Traffic	No	No	Fire Department Review
Half Closures		No	SunMetro must review	
Diagonal Diverters			No	
Median Barriers	ADT 1,000 - 7,500; > 25% Non-Local Traffic			
Forced Turn Islands				
Combined Measures - Subject to Constraints of Component Measures				

Placing the Traffic Calming Measures

The last task in laying out a traffic calming plan is to identify the actual locations where devices should be placed. Strategies for location devices differ depending on whether the major issue is speed control, volume-control, or safety.

NTMP Implementation

Placing Speed-Control Measures

If feasible, traffic calming measures should be spaced in such a way that the following two design speeds are achieved.

- Slow-Point 85th Percentile Design Speed – the speed that 85 percent of vehicles are going less than when they are crossing a traffic calming device; the target slow-point speed is defined as five mph below the posted speed limit
- Midpoint 85th Percentile Design Speed – the speed that 85 percent of vehicles are going less than when they are halfway between two traffic calming devices

The spacing of traffic calming measures directly affects the Midpoint speeds: the farther apart they are, the higher the Midpoint speed. See the sidebar for more information on setting spacing based on Midpoint speeds.

Placing Volume-Control Measures

Traffic calming devices intended to control traffic volumes can be placed either at entrances to a neighborhood or internally to the neighborhood.

Gateway Measures

Volume-control measures placed at entrances or gateways to the neighborhood can be more immediately effective in reducing volumes because non-local traffic is made aware even before entering the neighborhood that passing through is not a desirable option, causing them to choose to take other routes. However, these measures can also cause local traffic to take more circuitous paths than internal measures would.

Internal Measures

When placed internal to a neighborhood, measures have a less direct effect on non-local traffic. First-time attempts to cross the neighborhood will occur more frequently, especially soon after the devices are constructed. However, this type of placement can cause less of an inconvenience to local traffic.

Estimating Midpoint Speeds

In mathematical terms, the relationship between midpoint speed and spacing of slow points is given by an exponential function:

85th midpoint = 85th slow point + (85th street - 85th slow point)* 0.56* $(1-e^{-.004*spacing})$

Where,

- 85th midpoint = resulting 85th percentile speed at midpoint after calming
- 85th slow point = estimated 85th percentile speed at the slow point after treatment
- 85th street = 85th percentile speed of street before treatment
- Spacing = distance in feet between two devices

When Placing speed-control measures, the above formula should be used to test proposed spacing to determine whether the estimated midpoint speeds would be acceptable.

Chapter 4

Toolbox of Traffic Calming Measures

This chapter begins with an explanation of traffic devices that are not considered as part of the toolbox of traffic calming measures. Then an explanation of the traffic calming measures that constitute the standard "toolbox" of devices available to citizens and Traffic Engineering staff when developing neighborhood traffic management plans. The devices are divided into the following types:

- Level I Measures:
  - Non-Physical Measures;
- Level II Measures:
  - Narrowing Measures;
  - Horizontal Deflection Measures;
- Level III Measures:
  - Non-Physical Measures;
  - Narrowing Measures;
  - Horizontal Deflection Measures;
- Level III phase II Measures:
  - Diversion Measures.

For each non-physical and physical measure in the toolbox, a description, photograph, list of advantages and disadvantages, and approximate cost are provided. In addition, all physical traffic calming measure include an overhead schematic and detailed standard designs which are located in Appendix C.

Ineligible Traffic Control Devices

Modifications to speed limits and the addition of stop signs or traffic signals are not available through the NTMP. The warrants for these devices are explained below.

Speed Limits

Speed limits for collector and arterial roadways are established based upon recognized engineering criteria related to roadway design. Some of the criteria includes:

- Street width
- Lane width
- Sight distance
- The 85th percentile speed (critical speed)

By State statute, local streets, as defined by the vehicle code, have a 30 mph speed limit.
Close proximity to sources of pedestrian usage such as schools and parks may be cause for a lower speed limit.

Stop Signs

The City of El Paso does not install stop signs as part of the NTMP. The federal *Manual on Uniform Traffic Control Devices* (MUTCD) which is the recognized authority, states that "Stop Signs shall not be used for speed control." It has been the City's experience that unwarranted stop signs do not make effective traffic calming devices for the following reasons:

- Drivers generally tend to make up the time lost at an unwarranted stop sign by speeding up between signs.
- Stop signs also increase the noise and pollution level in a neighborhood from cars decelerating to stop, then accelerating.
- Drivers tend to run unwarranted stop signs once they notice no traffic in the opposing directions.

Stop signs are installed at locations where right-of-way assignment is required due to a large number of vehicles entering the intersection from all directions.

The following is a procedural list for stop sign traffic control:

1. Residents request for right-of-way management.
2. Analysis is performed, which includes traffic volume counts, pedestrian volume, accident history, sight distance, and on-site observations.
3. If the intersection meets necessary requirements (warrants), then stop sign traffic control is usually recommended.
4. Recommendations for the installation of stop signs at unwarranted locations would need to be forwarded to the to City Council for final approval.

Eligible But Not Preferred

Speed Hump

Speed humps and tables are not practical mitigation measures on all streets and roadways. Generally, speed humps and tables are designed for local neighborhood roadways with specific traffic volumes, vehicle speeds and residential frontages.

Speed humps are wave-shaped paved humps in the street. The height of the speed hump determines how fast it can be navigated without causing discomfort to the driver. Discomfort increases as the speed over the hump increases.

Approximate Cost: $2,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -22%
Volume Impacts – Reduction in vehicles per day = -18%

Source: Traffic Calming: State of the Practice, 2000

Advantages

Slows traffic immediately.
Self-enforcing.

Disadvantages

Greatly increases response time for emergency vehicles.
Motorists tend to speed up between humps.
Increases noise and pollution in neighborhood.

Speed Table

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

Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

Approximate Cost: $2,500

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -18%
Volume Impacts – Reduction in vehicles per day = -12%

Source: Traffic Calming: State of the Practice, 2000

Advantages

They are smoother on large vehicles (such as fire trucks) than Speed Humps
They are effective in reducing speeds, though not to the extent of Speed Humps

Disadvantages

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

Level I Measures

Non-Physical Measures

Description

Non-physical measures include any measures that do not require the construction of physical modifications to the roadway. This category includes signing and striping modifications, as well as temporary use of certain enforcement strategies.

- Education Programs
- Targeted Speed Enforcement
- Radar Trailers
- Speed Feedback Signs
- Lane Striping
- Optical Bars
- Signage
- Speed Legend
- Raised Pavement Markers
- Delineator
- High Visibility Crosswalk
- Angled Parking

Toolbox

Education

Activities that change people's perceptions and help alter driver behavior are most preferred. Meetings and workshops with neighbors and City staff can help implement and direct NTMP applications. Most traffic problems are a result of human behavior. Through outreach programs and neighborhood watch programs, all residents can play a big part in spreading the information.

Approximate Cost: Varies

Advantages

- Education can be flexible in duration
- Everyone can afford it

Disadvantages

- May be difficult to measure its effectiveness
- May take time to be effective

Targeted Speed Enforcement

The Traffic Division identifies locations for temporary targeted enforcement enhancements, based on personal observations and survey comments. A request is then submitted to the Police Department for the desired enforcement. Because of limited citywide resources, the targeted enforcement will not be continued indefinitely. Targeted enforcement may also be used in conjunction with new traffic calming devices to help drivers become aware of the new restrictions.

Approximate Cost: Varies

Advantages

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow trucks, buses, and emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages

- Expensive to maintain an increased level of enforcement
- Effectiveness may be Temporary

Toolbox

Radar Trailer

A radar trailer is a device that measures each approaching vehicle's speed and displays it next to the legal speed limit in clear view of the driver, reminding speeding drivers to slow to the speed limit. They can be easily placed on a street for a limited amount of time then relocated to another street, allowing a single device to be effective in many locations.

Approximate Cost: $6,000 - $20,000

Advantages

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in the short-run

Disadvantages

- Effectiveness may be temporary
- Aesthetics
- Only effective for one direction of travel
- Subject to vandalism

Speed Feedback Signs

Speed feedback signs perform the same functions as radar trailers but are permanent. Real-time speeds are relayed to drivers and flash when speeds exceed the limit. Speed feedback signs are typically mounted on or near speed limit signs and can also be mobile units. They are especially effective near schools and parks.

Approximate Cost: $3,300 - $4,200

Advantages

- Inexpensive
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages

- Requires power source
- Only effective for one direction of travel
- Long-term effectiveness uncertain
- Subject to vandalism

Toolbox

Lane Striping

Lane striping can be used to create formal bicycle lanes, parking lanes, or simple edge lines. As a traffic calming measure, they are used to narrow the travel lanes for vehicles to encourage drivers to lower their speeds. The past evidence on speed reductions is, however, inconclusive.

Approximate Cost: $1 per linear foot

Advantages

- Inexpensive
- Can be used to create bicycle lanes or delineate on-street parking
- Does not require time for design
- Does not slow emergency vehicles

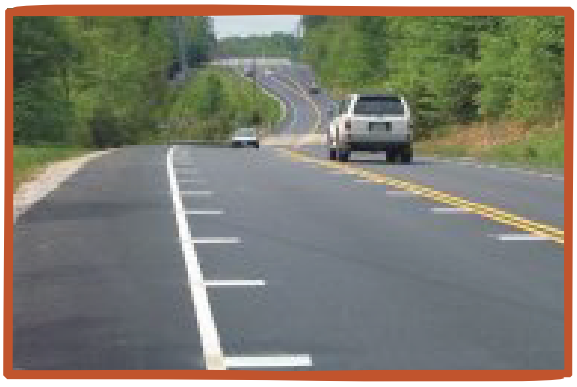
Disadvantages

- Has not been shown to significantly reduce speeds
- Increased regular maintenance

Optical Speed Bars

Optical speed bars are a series of pavement markings spaced at decreasing distances. They have typically been used in construction areas to provide drivers with the impression of increased speed.

Approximate Cost: $1 per linear foot



Advantages

- Inexpensive
- Reduction in 85th percentile speed
- Does not slow bus and emergency vehicles
- Does not require time for design

Disadvantages

- Effectiveness diminishes after repeated use
- Aesthetics

Toolbox

Signage

Signage can be an effective tool for advising drivers of:

- speed limits,
- truck restrictions, and
- cross traffic that does not stop

Approximate Cost: $200 per sign

Advantages

- Inexpensive
- Does not require time for design
- Turn restrictions can reduce cut-through traffic
- Does not significantly slow emergency vehicles

Disadvantages

- Speed limit signs are ineffective if unaccompanied by increased police enforcement
- If speed limit is set unreasonably low, drivers are more likely to exceed it

Speed Legends

Speed legends are numerals painted on the roadway, indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts. Speed legends can be useful in reinforcing a reduction in speed limit between one segment of a roadway and another segment. They may also be placed at major entry points into a residential area.

Advantages

- Inexpensive
- Helps reinforce a change in speed limit
- Does not require time for design
- Does not slow emergency vehicles

Disadvantages

- Has not been shown to significantly reduce travel speeds

Toolbox

Raised Pavement Markers

Raised reflectors lining the centerline and/or edgeline of a roadway add a visual queue to the driver to not deviate outside of the proper lane. Raised reflectors also improve the nighttime visibility of roadways.

Raised pavement markers can also be arranged in a rectangular array across the roadway, creating a rumble strip. These can be effective in reducing travel speeds but also increase roadway noise considerably. Consequently, rumble strips are only recommended for placement in very low density areas.

Approximate Cost: $4.50 per marker

Advantages

- Inexpensive
- Does not slow trucks, buses, and emergency vehicles
- Queues drivers to respect lanes on curves and under low visibility conditions

Disadvantages

- Increased noise
- Increased maintenance

Delineator

Much like raised pavement markers, delineators may be used to further define a centerline and/or edgeline of a roadway. Moreover, delineators add a vertical element to the roadway. Delineators can also be used with physical measures found in Level II to further improve their traffic calming effectiveness.

Approximate Cost: $45 per Delineator

Advantages

- Inexpensive
- Reduction in 85th percentile speed
- Does not slow buses and emergency vehicles
- Does not require time for design

Disadvantages

- Increase maintenance
- Decreased aesthetics

Toolbox

High Visibility Cross Walk

Using special pavement marking patterns and raised reflectors increases the visibility of a crosswalk. The "triple four" marking pattern is an effective manner to increase the visibility of a crosswalk with typical painting materials. The unpainted space along the center of the crosswalk allows pedestrians and those in wheelchairs to cross in the rain without the sliding problems found on typical crosswalks that engross the entire crossing area.

Approximate Cost: $2,000

Advantages

- Inexpensive
- Does not slow buses and emergency vehicles

Disadvantages

- Effectiveness diminishes after repeated use

Angled Parking

Angled parking reorients on-street parking spaces to a 45–degree angle, increasing the number of parking spaces and reducing the width of the roadway available for travel lanes. Angled parking is also easier for vehicles to maneuver into and out of than parallel parking. Consequently, it works well in locations with high parking demand, such as multifamily, commercial, and mixed-use areas.

Approximate Cost: $250- $300 per stall

Advantages

- Reduces speeds by narrowing the travel lanes
- Increases the number of parking spaces
- Makes parking maneuvers easier and takes less time than with parallel parking
- Favored by businesses and multifamily residences

Disadvantages

- Precludes the use of bike lanes (unless roadway is wider than 58 feet)
- Ineffective on streets with frequent driveways
- May be incompatible with one-way streets approaching a two-way segment

Level II Measures

Narrowing Devices

Description

Narrowing devices use raised islands and curb extensions to narrow the travel lane for motorists. The narrowing devices in the toolbox include:

- Bulbouts
- Two-Lane Chokers
- Center Island Narrowings/Pedestrian Refuge Islands

Toolbox

Bulbouts

Bulbouts (neckdowns, intersection narrowings, safe crosses, etc.) are curb extensions that reduce roadway width curb to curb at either midblock or intersection locations. Midblock treatments narrow the travel lane but do not provide additional sidewalk width. Intersection treatments reduce vehicle travel speeds by tightening curb radii and improve pedestrian safety by shortening crossing distance.

Intersection treatments can be retrofit into an existing intersection without modifying the existing drainage, or they can be designed to provide additional sidewalk width for increased pedestrian use or street furniture. The effects are increased pedestrian comfort and safety at the intersection.

Approximate Cost: $2,000-5,000 for four corners (without drainage modifications) or $25,000 per corner with full drainage modifications

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%
Volume Impacts – Reduction in vehicles per day = -10%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Improves pedestrian circulation and standing space on sidewalk area
- Through and left-turn movements are easily negotiable by large vehicles
- Creates protected on-street parking bays
- Reduces speeds (especially right-turning vehicles) and traffic volumes
- Provides opportunity for landscaping and street furniture

Disadvantages

- Effectiveness is limited by the absence of vertical or horizontal deflection
- May slow right-turning emergency vehicles
- Potential loss of on-street parking
- May require bicyclists to briefly merge with vehicular traffic

Toolbox

Two-Lane Choker

Chokers are curb extensions at mid-block that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also called safe crosses.

Chokers leave the street cross section with two lanes that are narrower than the normal cross section.

Approximate Cost: $5,000-10,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%

Volume Impacts – Reduction in vehicles per day = -10%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Easily negotiable by large vehicles (such as fire trucks)
- If designed well, can have positive aesthetic value
- Reduces both speeds and volumes
- Opportunity for landscaping

Disadvantages

- Effect on vehicle speeds is limited by the absence of any horizontal deflection
- May require bicyclists to briefly merge with vehicular traffic
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Toolbox

Center Island Narrowing/Pedestrian Refuge Island

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

Approximate Cost: $6,000-9,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%
Volume Impacts – Reduction in vehicles per day = -10%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Increases pedestrian safety
- If designed well, can have positive aesthetic value
- Reduces traffic volumes
- Opportunity for landscaping

Disadvantages

- Effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Level II Measures

Horizontal Deflection Devices

Description

Horizontal deflection devices use raised islands and curb extensions to eliminate straight-line paths along roadways and through intersections. The horizontal deflection devices in the toolbox include:

- Traffic Circles
- Roundabouts
- Lateral Shifts
- Chicanes

Toolbox

Traffic Circle

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are usually circular in shape and landscaped in their center islands, though not always. Traffic controls at the approaches vary by location. Circles prevent drivers from speeding through intersections by impeding the straight-through movement and forcing drivers to slow down to yield. Drivers must first turn to the right, then to the left as they pass the circle, and then back to the right again after clearing the circle.

Approximate Cost: $10,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -11%
Volume Impacts – Reduction in vehicles per day = -5%
Safety Impacts – Reduction in average annual number of collisions = -71%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- If designed well, can have positive aesthetic value
- Very effective in moderating speeds and improving safety
- Opportunity for landscaping

Disadvantages

- Difficult for large vehicles (such as fire trucks) to circumnavigate
- Must be designed so that the circulating lane does not encroach on crosswalks
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Toolbox

Roundabout

Like traffic circles, roundabouts require traffic to circulate counterclockwise around a center island. But unlike circles, roundabouts are used on higher volume streets to allocate rights-of-way among competing movements. They are found primarily on arterial and collector streets, often substituting for traffic signals or all-way stop signs. They are larger than neighborhood traffic circles and typically have raised splitter islands to channel approaching traffic to the right.

Approximate Cost: $100,000-$200,000 for retrofits; $100,000 for a single lane and $150,000 for two lanes in new developments

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = I/D
Volume Impacts – Reduction in vehicles per day = I/D
Safety Impacts – Reduction in average annual number of collisions = -15% to 33%
Notes: I/D = Insufficient Data

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Moderates traffic speed on an arterial
- Enhanced safety compared to a traffic signal
- Minimizes queuing at approaches to the intersection
- Less expensive to operate than traffic signals
- Provides opportunity for landscaping and street furniture

Disadvantages

- May require major reconstruction of an existing intersection
- Loss of on-street parking
- Increases pedestrian distance from one crosswalk to the next
- Difficult for visually impaired pedestrian to navigate
- Maintenance of landscaping (City vs. residents)

Toolbox

Lateral Shift

Lateral shifts are curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way to the original direction of travel. Lateral shifts, with just the right degree of deflection, are one of the few measures that have been used on collectors or even arterials, where high traffic volumes and high posted speeds preclude more abrupt measures.

Approximate Cost: Varies by size of offset and length of transition

Advantages

- Can accommodate higher traffic volumes than many other traffic calming measures
- Easily negotiable by large vehicles (such as fire trucks)
- Opportunity for landscaping and street furniture

Disadvantages

- Potential loss of on-street parking
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Maintenance of Landscaping

Toolbox

Chicane

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

Approximate Cost: $8,000-14,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = I/D
Volume Impacts – Reduction in vehicles per day = I/D
Safety Impacts – Reduction in average annual number of collisions = I/D
Notes: I/D = Insufficient Data

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by large vehicles (such as fire trucks) except under heavy traffic conditions
- Provides opportunity for landscaping and street furniture

Disadvantages

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be costly, especially if there are drainage issues
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Level III Phase II Measures

Diversion Devices

Description

Diversion devices use raised islands and curb extensions to preclude particular vehicle movements, such as left-turn or through movements, usually at an intersection. These devices can only be considered after Phase I devices have been attempted and fail to resolve the traffic problem. The diversion devices in the toolbox include:

- Full Closures
- Half Closures
- Diagonal Diverters
- Median Barriers
- Forced Turn Islands

Toolbox

Full Closure

Full street closures are barriers placed across a street to close the street completely to through traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car.

Approximate Cost: $30,000-100,000

Advantages

- Able to maintain pedestrian and bicycle access
- Very effective in reducing traffic volumes
- Opportunity for landscaping

Disadvantages

- Requires legal procedures for public street closures
- Causes circuitous routes for local residents and emergency services
- May be expensive
- May limit access to businesses
- Maintenance of landscaping (City vs. residents

Toolbox

Half Closure

Half street closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. Half closures are the most common volume control measure after full street closures. Half closures are often used in sets to make travel through neighborhoods with gridded streets circuitous rather than direct. That is, half closures are not lined up along a border, which would preclude through movement, but instead are staggered, leaving through movement possible but less attractive than alternative routes.

Approximate Cost: $6,500

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -19%
Volume Impacts – Reduction in vehicles per day = -42%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Able to maintain two–way bicycle access
- Effective in reducing traffic volumes

Disadvantages

- Causes circuitous routes for local residents and emergency services
- May limit access to businesses
- Drivers can circumvent the barrier

Toolbox

Diagonal Diverter

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.

Approximate Cost: $15,000-35,000

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -4%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Does not require a closure per se, only a redirection of existing streets
- Able to maintain full pedestrian and bicycle access
- Reduces traffic volumes

Disadvantages

- Causes circuitous routes for local residents and emergency services
- May be expensive
- May require reconstruction of corner curbs

Toolbox

Forced-Turn Island

Forced–turn islands are raised islands that block certain movements on approaches to an intersection.

Approximate Cost: $3,000-5,000

Measured Impacts

Volume Impacts – Reduction in vehicles per day = -31%

Source: Traffic Calming: State of the Practice, 2000

Advantages

- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- Reduces traffic volumes

Disadvantages

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

Toolbox

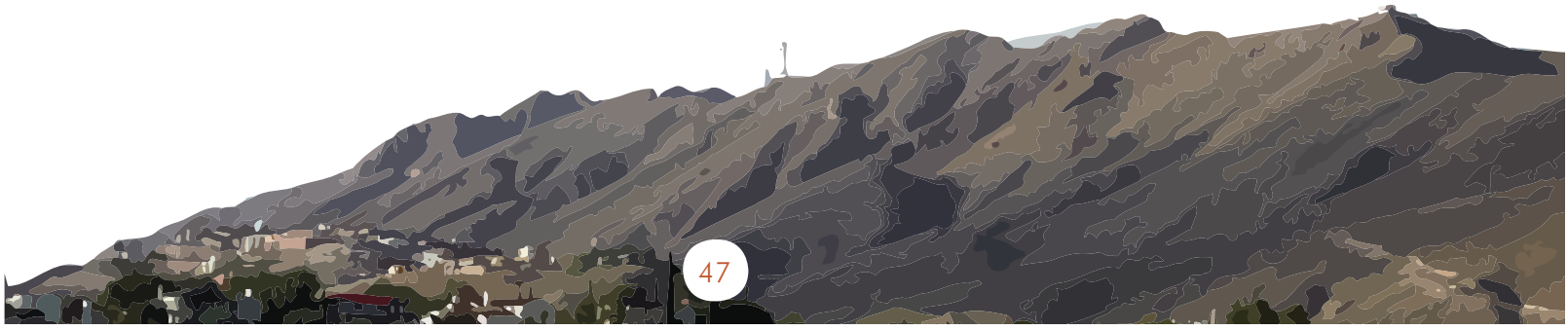
Effectiveness Comparison

Table 4 summarizes the effectiveness data that has been compiled for each of the traffic calming measures in the toolbox. Note that these data are averages. Actual effectiveness can vary based on site specific circumstances, such as proximity to major roads and the availability of alternate routes.

Table 4 – Quantitative Impacts of Traffic Calming Measures

Types of Measures	Effectiveness									
	85th Percentile Speeds				Vehicles Per Day		Average Annual Collisions			
	Before	After	Change	Percent Change	Change	Percent Change	Before	After	Change	Percent Change
Phase I Non-Physical Measures	***I/D***									
Phase I Narrowing Measures										
Bulbouts										
Two-Lane Chokers										
Center Island Narrowings / Pedestrian Refuges	34.9	32.3	-2.6	-7%	-293	-10%	I/D			
Phase I Horizontal Measures										
Traffic Circles	34.2	30.3	-3.9	-11%	-293	-5%	2.19	64%	-1.55	-71%
Roundabouts (Single-Lane)	Insignificant Speed Effects				Insignificant Volume Effects		Not Recorded			-15% to -33%
Lateral Shifts	I/D				I/D		I/D			
Chicanes	I/D				I/D		I/D			
Phase II Diversion Measures										
Full Closures	I/D	I/D	I/D	I/D	-671	-44%	I/D			
Half Closures	32.3	26.3	-6	-19%	-1611	-42%	I/D			
Diagonal Diverters	29.3	27.9	-1.4	-4%	-501	-35%	I/D			
Median Barriers / Forced Turn Islands	I/D	I/D	I/D	I/D	-1167	-31%	I/D			

Notes: I/D = Insufficient Data
Source: Traffic Calming: State of the Practice (Ewing, 1999)



Appendix A - Summary of Existing Policies

Existing Neighborhood Traffic Management Program

The existing Neighborhood Traffic Management Program (NTMP) is a program that was developed to address ever-increasing concerns regarding the safety and livability of neighborhoods. This information brochure was developed by the City of El Paso, Traffic Division to briefly describe the NTMP.

What is the purpose off the existing NTMP?

The purpose of the existing NTMP is to address speeding on local residential streets. The goal of this program is to create an environment within neighborhoods that promotes safety for both the driver and neighborhood residents. The program will always attempt to focus on a neighborhood as a whole, not just one street or intersection.

How can the existing NTMP slow down traffic on residential streets?

The existing NTMP seeks to improve safety for pedestrians, bicyclists, motorists, and all other road users by implementing calming measures in progressive steps. The first step and least intrusive, is education. The second is enforcement. From there, more aggressive techniques are available, such as: installing certain types of landscaping, chicanes, diverters, bulbouts, neck downs, chokers, manufactured speed cushions or pillows, and many other alternatives.

How can neighborhoods qualify for the existing program?

The existing NTMP is designed to work with City recognized Neighborhood Associations or Neighborhood Watch Programs. If a citizen calls, the staff will work with that citizen, listen to concerns, conduct a preliminary investigation, and offer solutions to his/her concern. However, to qualify for the NTMP, the residents must work through their Neighborhood Association or Neighborhood Watch Program.

What factors does the Traffic Engineering Division consider when qualifying a Neighborhood for the existing NTMP?

A. Speeding The Traffic Engineering Division will consider implementing additional traffic calming measures through the NTMP when a speed study shows that 35% of the traffic is traveling over the posted speed limit.
B. Cut-Through Traffic Cut-through traffic should represent at least as much as the study area's self-generated total average daily traffic to initiate NTMP efforts.
C. Accidents – Pedestrians, Bicycles, Autos Accident history may be considered in the ranking system when there are 3 or more reported accidents along a single residential street within twelve consecutive months.
D. Street Grades and Alignment Some physical traffic management devices cannot be installed on streets with large grades or poor visibility.
E. Emergency Routes Traffic management devices are not typically installed on streets serving as a designated primary emergency access route or on collectors or thoroughfares.

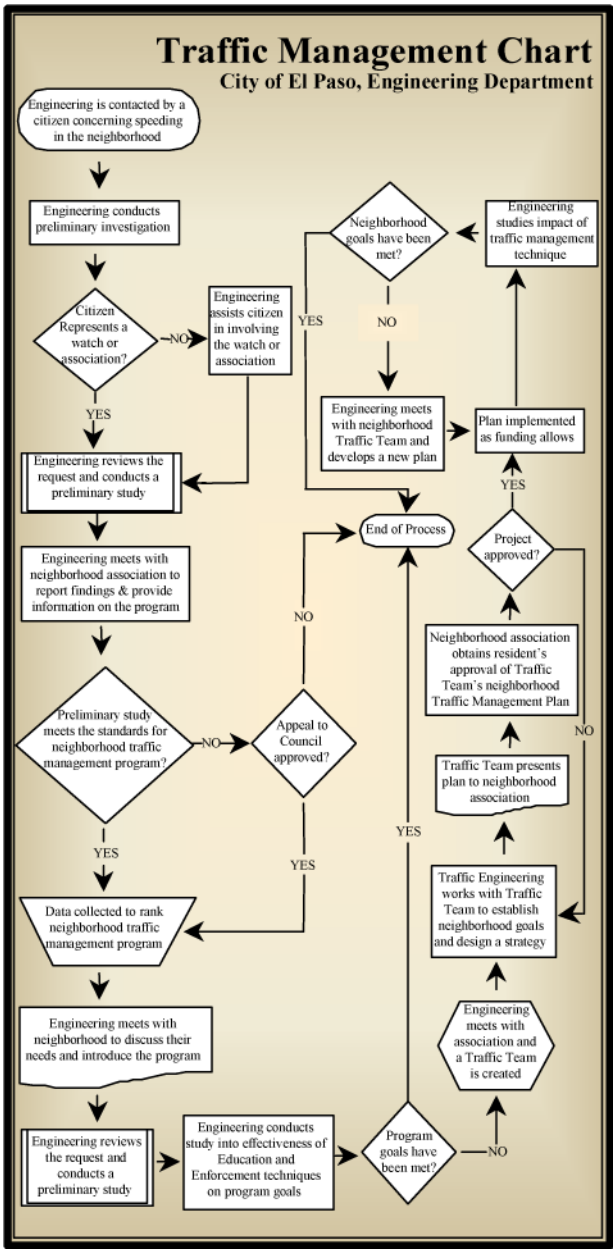
Who provides the funding for existing NTMP projects?

If funding is required, it will be provided by the neighborhood watch or association themselves, through an alternate source (donations, etc), or it can be provided for them at the discretion of the area's City Representative (through discretionary funds) or by the City council as a whole. Depending on the number of NTMP requests received and the available funding for design and construction, a project may be placed on a waiting list and prioritized based on the severity of the neighborhood's situation.

Appendix A - Summary of Existing Policies

How does the existing NTMP work?

The following flow chart was developed to further explain the existing NTMP step-by-step process.



Appendix A - Summary of Existing Policies

Existing NTMP Guiding Policies and Definitions

1) This program applies to existing residential streets that serve single-family residential neighborhoods. The neighborhood must be entirely within the City of El Paso. This program will work with neighborhood watches and associations, not individual citizens.

2) Cut-through traffic is defined as: traffic having no immediate starting point or ending point in the residential neighborhood being evaluated. This traffic traditionally flows on major roadways, but may be finding its way into residential streets seeking short cuts.

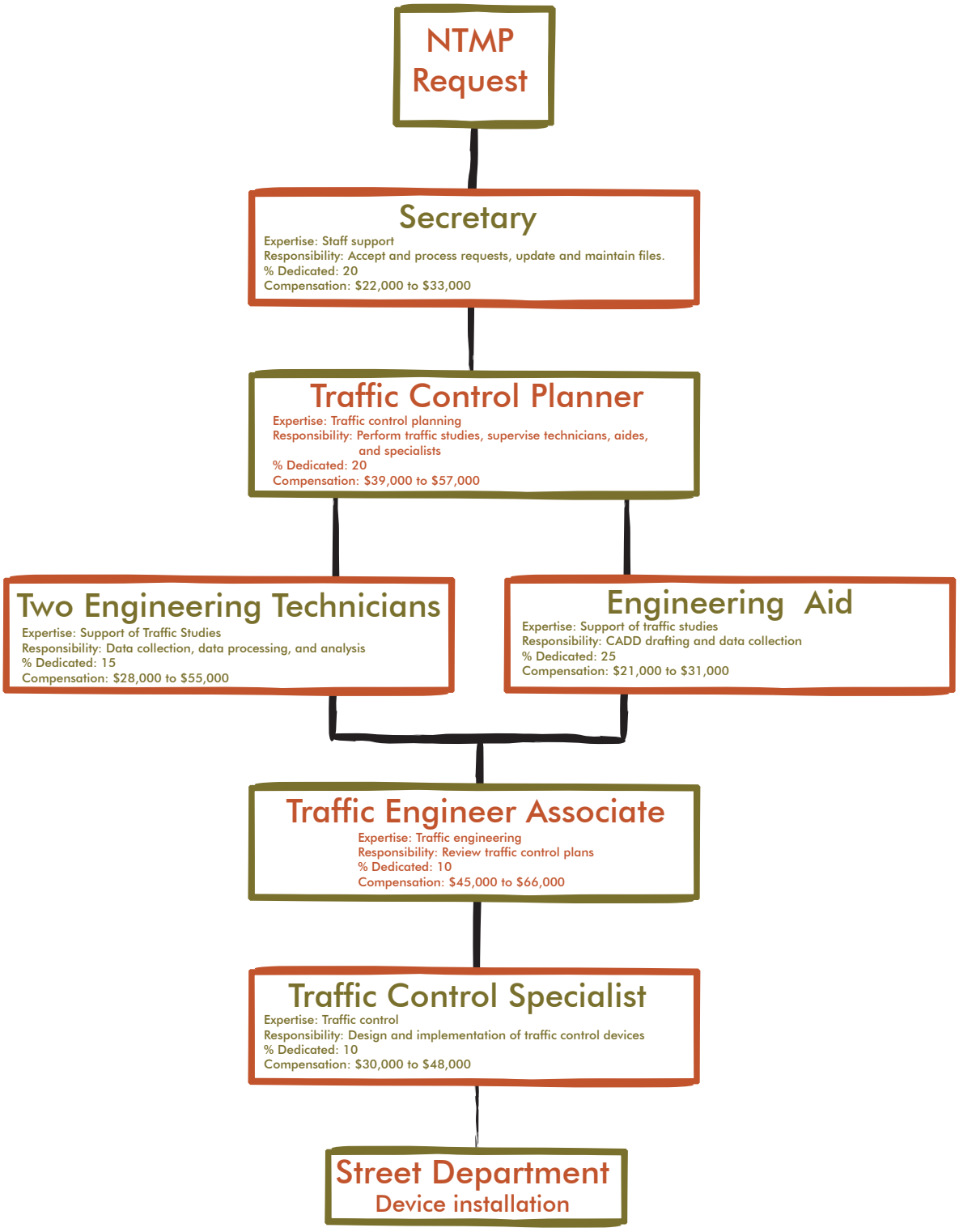
3) The amount of re-routed traffic that is acceptable as a result of a traffic management project should be defined on a project-by-project basis. It is not the intent of this program to simply relocate traffic or traffic concerns to other residential streets, although it may be desirable to balance traffic across a network of residential streets.

4) Emergency vehicle access within and through neighborhoods will be carefully considered in the evaluation of traffic management and must be preserved in a reasonable fashion.

5) The Traffic Engineering Division shall employ a variety of traffic management strategies and techniques to achieve the NTMP objectives. Techniques that have less of an impact will be utilized before harsher or more substantial techniques are considered.

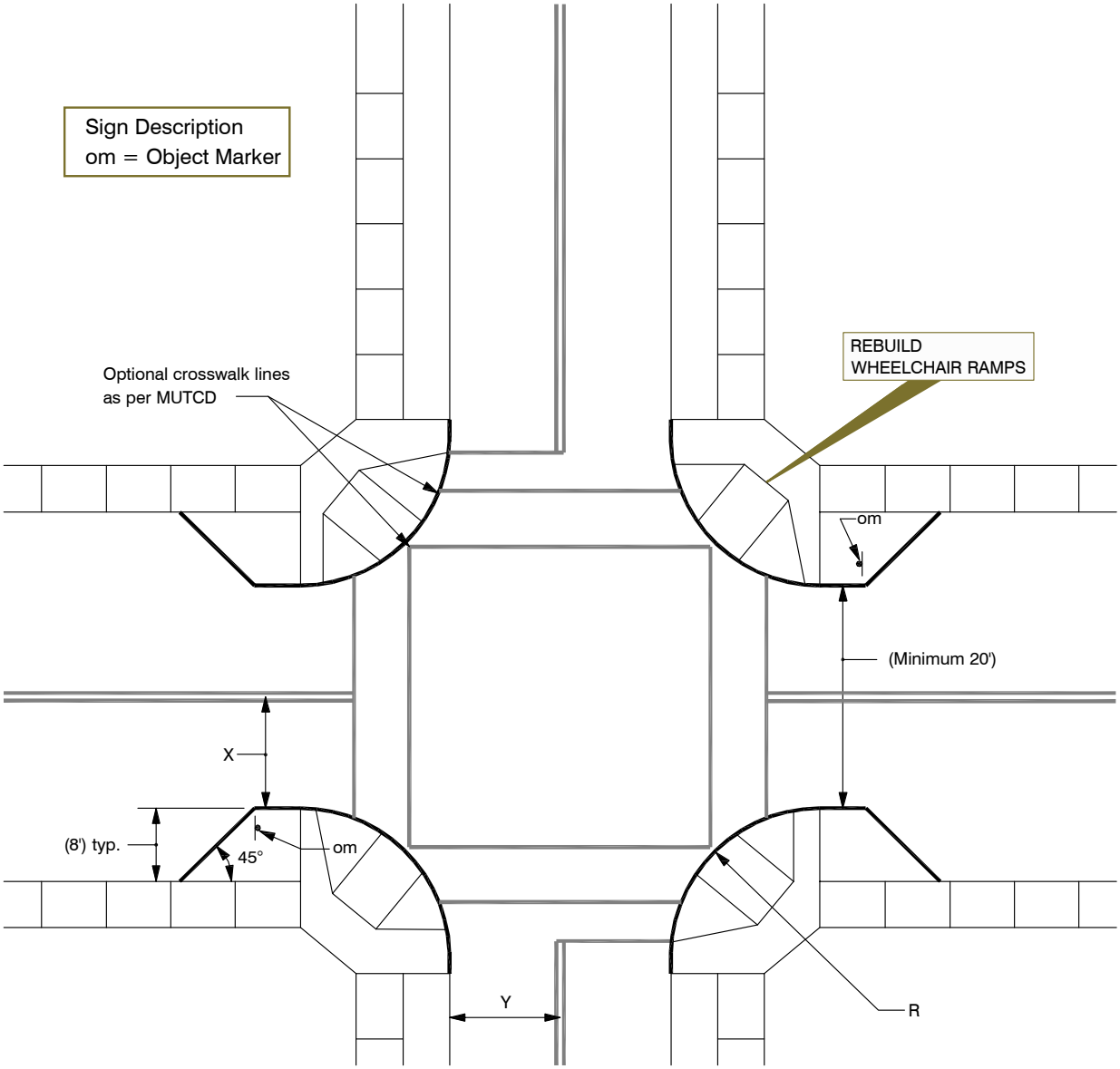
6) Traffic management strategies and techniques shall be planned and designed in conformance with sound engineering practices. All plans will be reviewed and approved by the Traffic Engineering Division staff before the implementation to ensure that proper engineering guidelines have been followed. The Traffic Engineering Division staff will make changes as necessary to ensure safe, sound engineering principles are implemented.

Appendix B - Workflow and Staffing



Appendix C - Design Standards

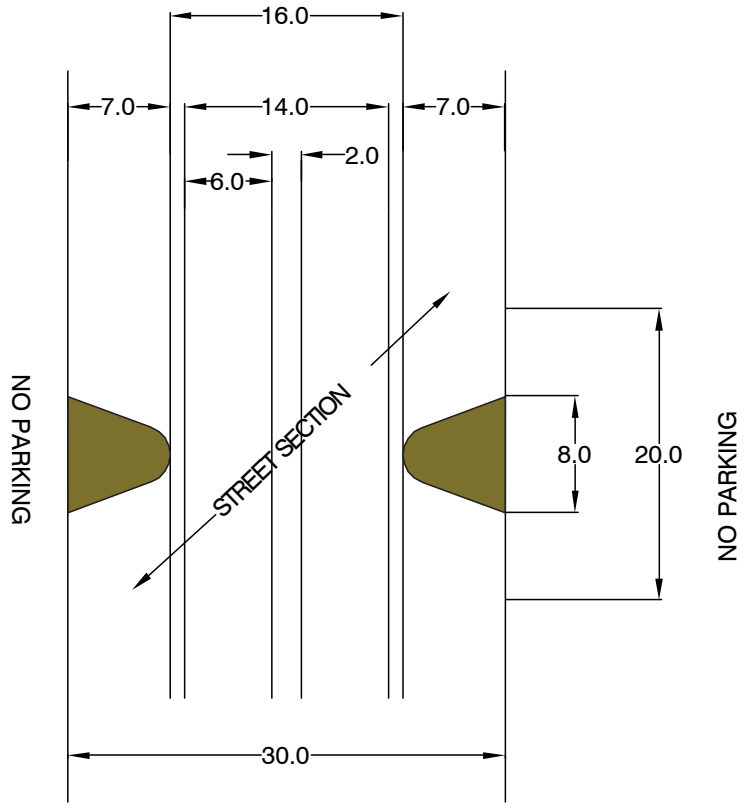
Bulbout
(Intersection Treatment)



For The Street Widths:		Use This Curb Radius:
X	Y	R
12'	12'	40'
12'	14'	32'
12'	16'	26'
14'	12'	37'
14'	14'	35'
14'	16'	24'

NOTES: 1. Distance X is referenced from the center of the roadway to the lip of gutter.

Bulbout
(Midblock Treatment)



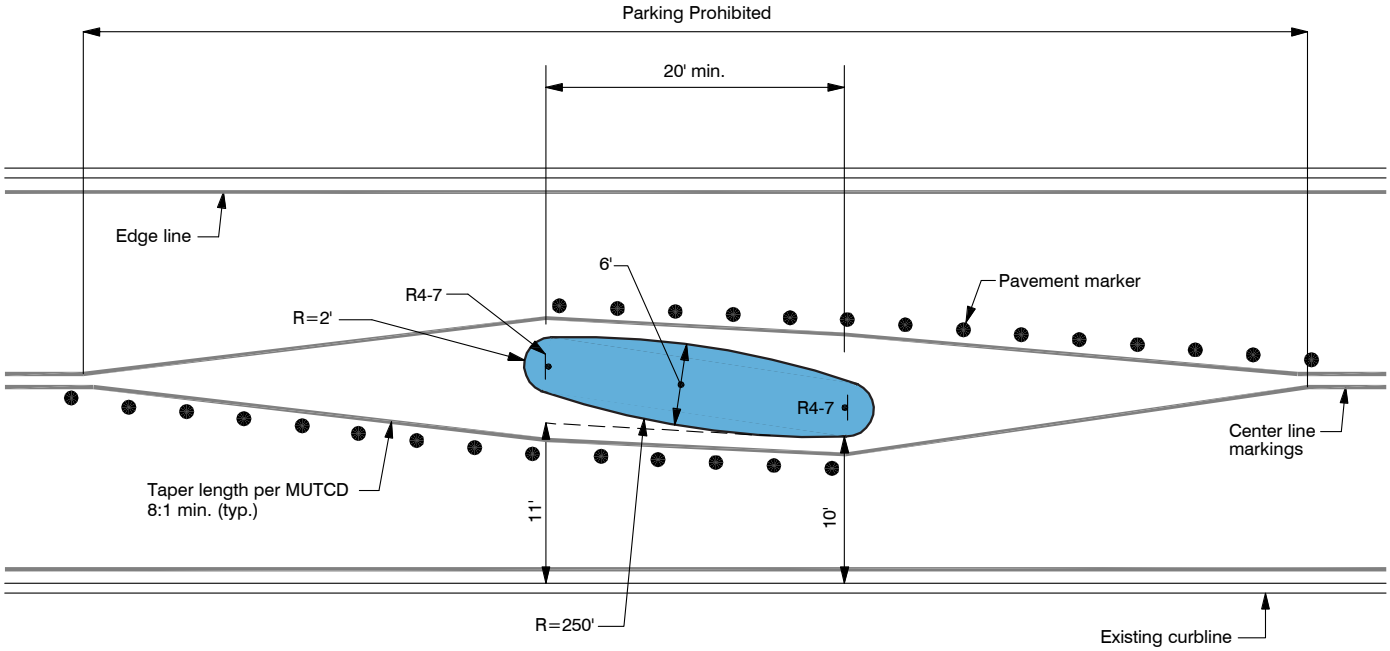
MIN. 30' WIDE STREET
FOR WIDER STREETS
MAKE BULB DEEPER

THE BULB-OUT DRAWING SHOWN IS FOR A 30 FOOT WIDE STREET. IF A STREET IS WIDER, THE BULB WOULD BE DEEPER; EACH BULB SHOWN IS SEVEN FEET DEEP. THE WIDTH BETWEEN BULBS SHOULD BE 16 FEET, WHICH ALLOWS FOR ONE FOOT BETWEEN BULB AND CAR, SIX FEET PER CAR AND TWO FEET BETWEEN CARS. THIS WOULD REQUIRE CARS TO SLOW DOWN SUBSTANTIALLY IN ORDER TO PASS. THE BULB WOULD RESTRICT PARKING FOR APPROXIMATELY 20 FEET (ONE CAR LENGTH FOR PARKING PURPOSES) IN ORDER FOR THE BULB TO BE VISIBLE, ALLOW WIDER VEHICLES TO PULL TO THE RIGHT AND ALLOW AN OPPOSING VEHICLE TO PASS. IT MAY BE POSSIBLE TO PLANT A TREE IN EACH BULB.

Appendix C - Design Standards

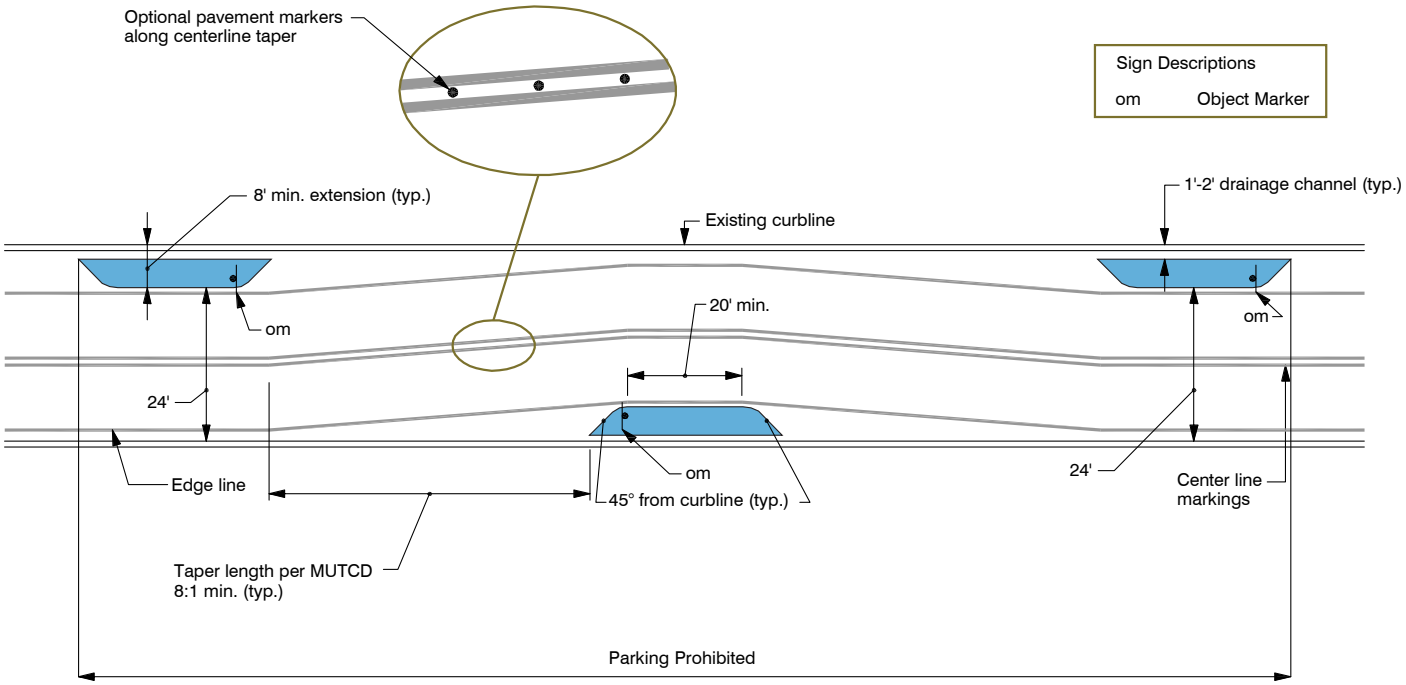
Center Island Narrowing

Sign Description	
R4-7	Keep Right



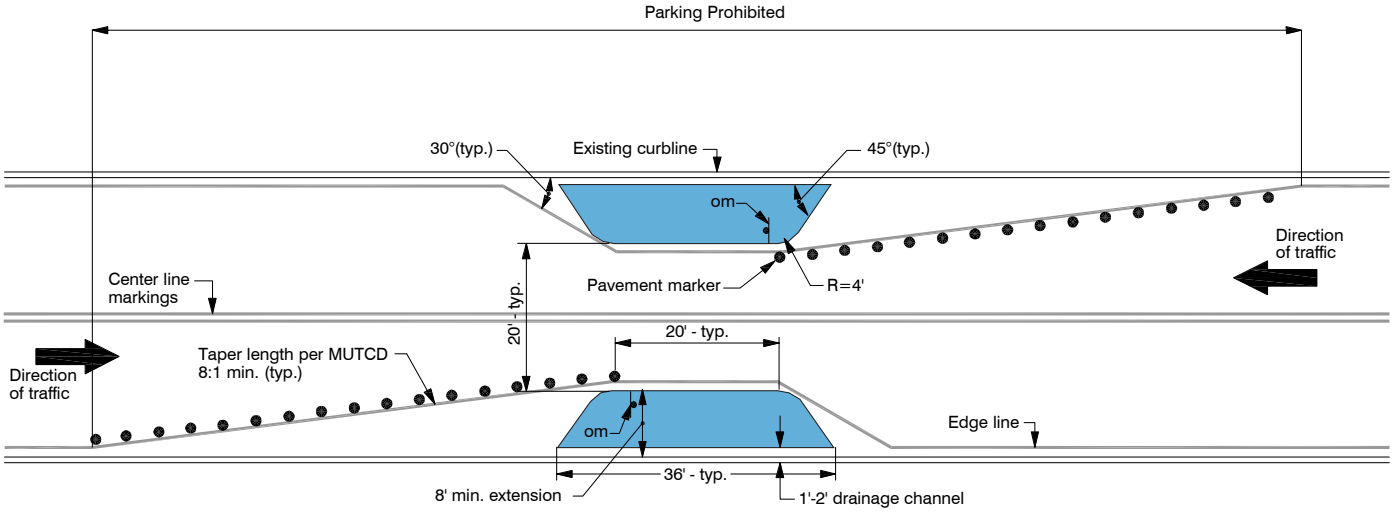
Chicane

Sign Descriptions	
om	Object Marker



Appendix C - Design Standards

CHOKER

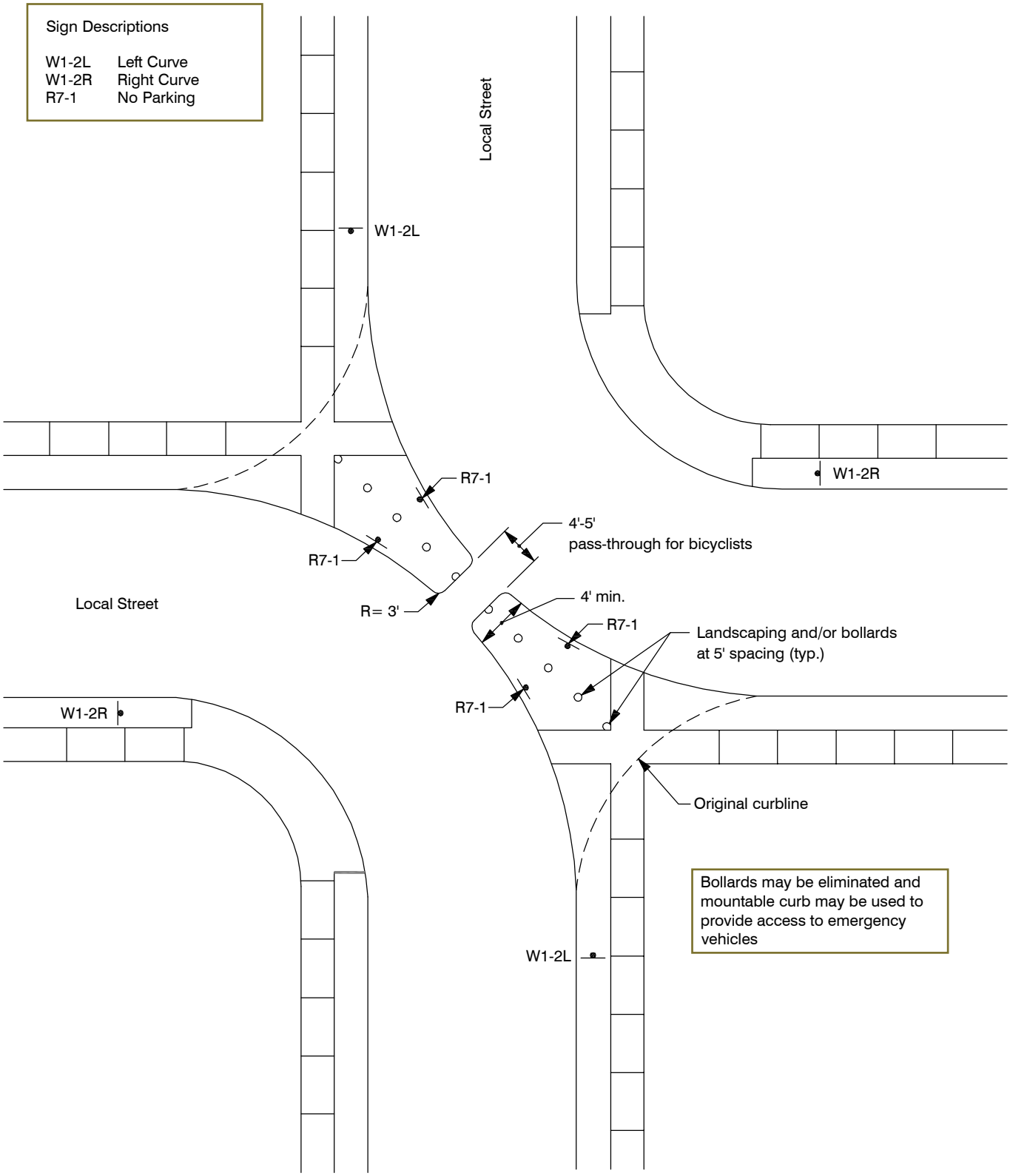


Sign Descriptions

om = Object Marker

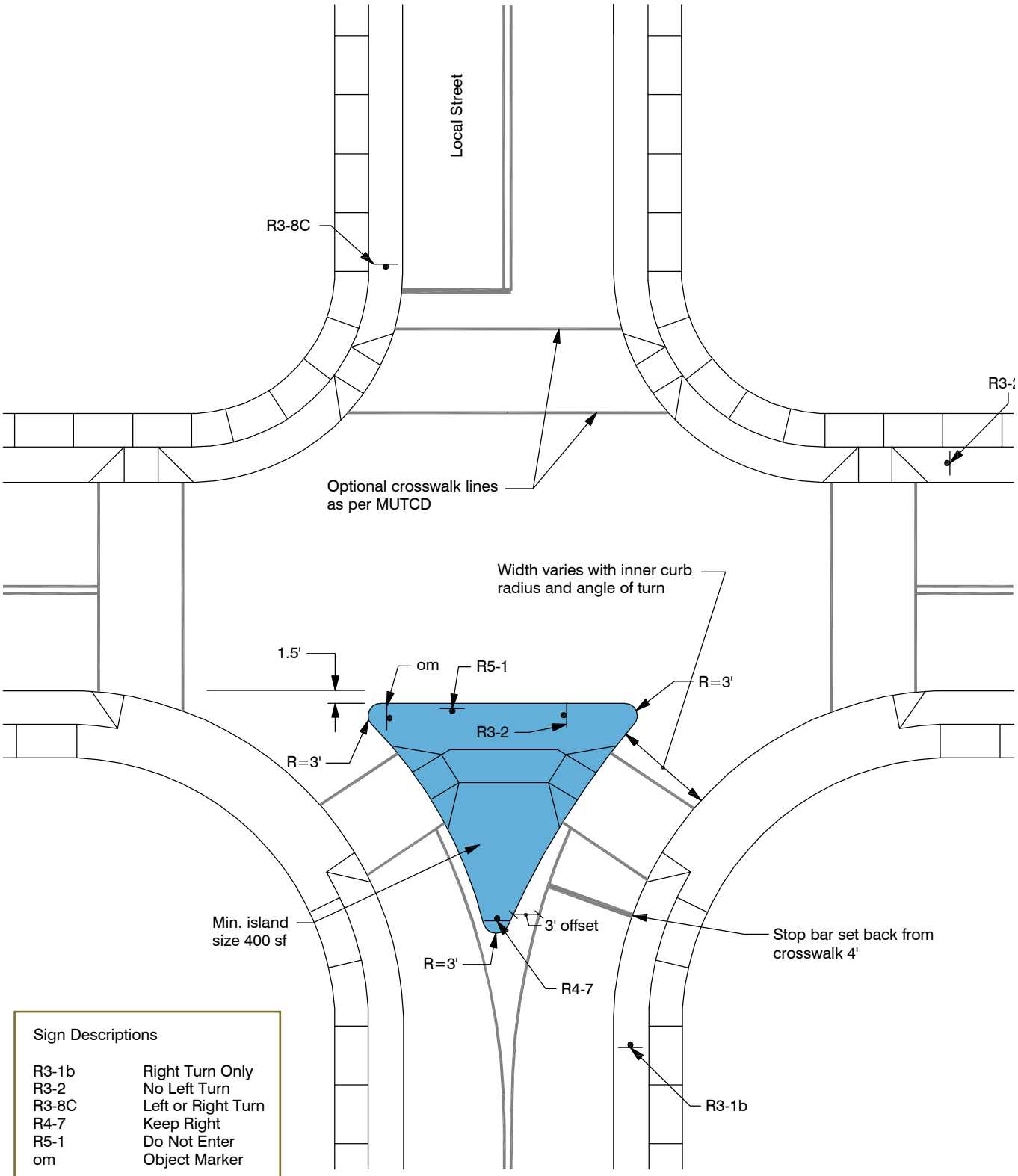
Appendix C - Design Standards

Diagonal Diverter



Appendix C - Design Standards

Forced Turn Island

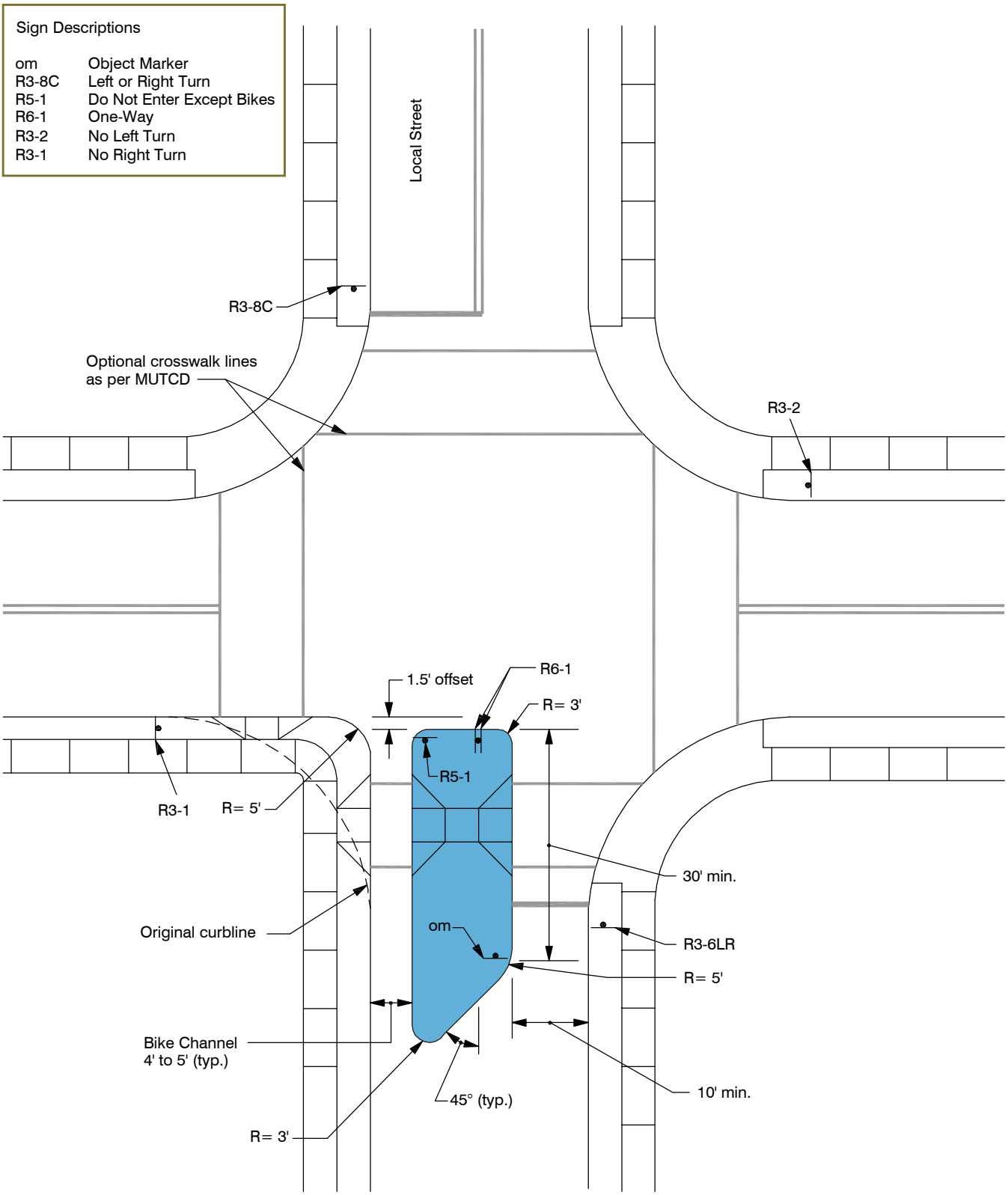


Sign Descriptions

R3-1b	Right Turn Only
R3-2	No Left Turn
R3-8C	Left or Right Turn
R4-7	Keep Right
R5-1	Do Not Enter
om	Object Marker

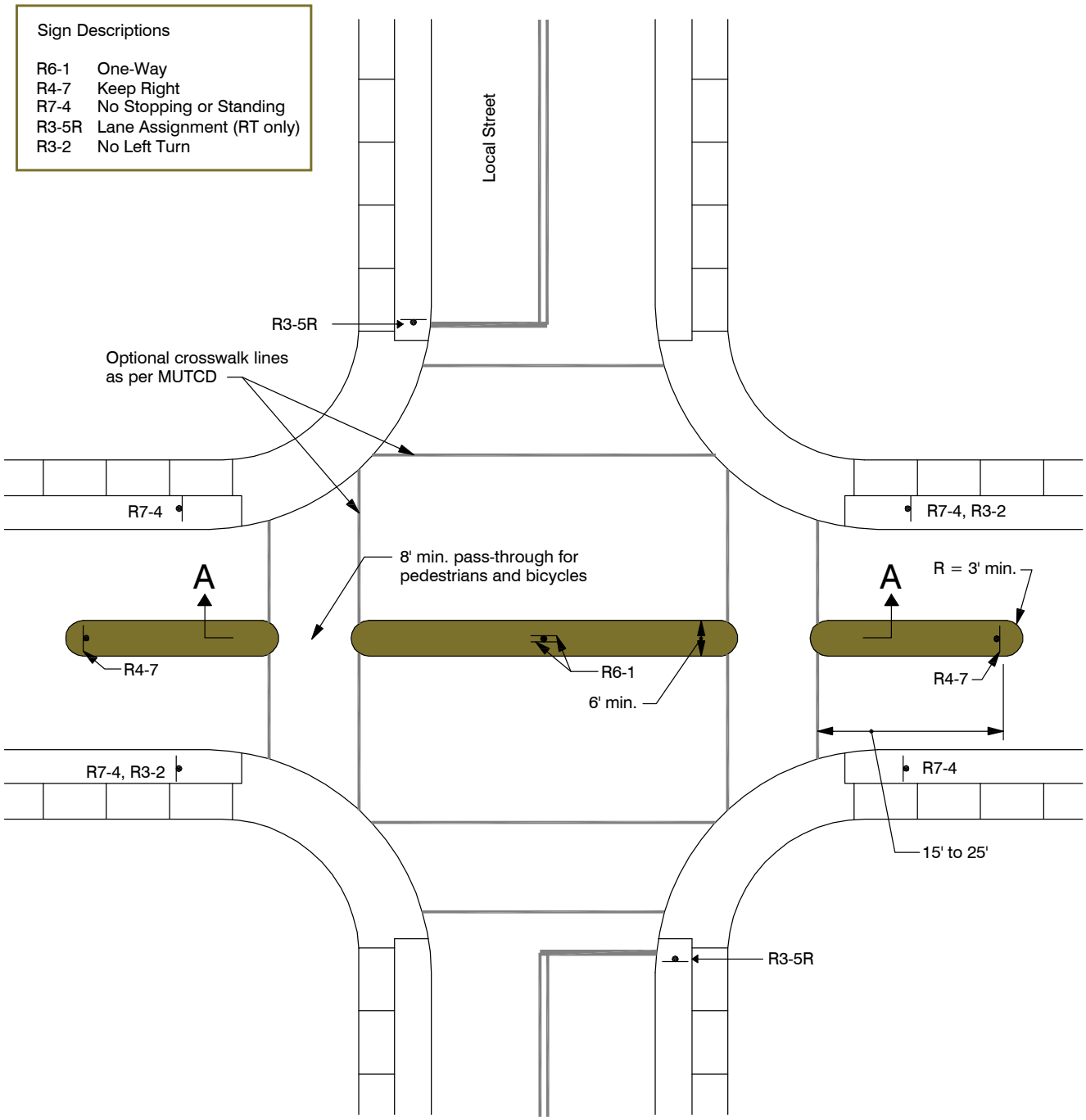
Appendix C - Design Standards

Half Closure

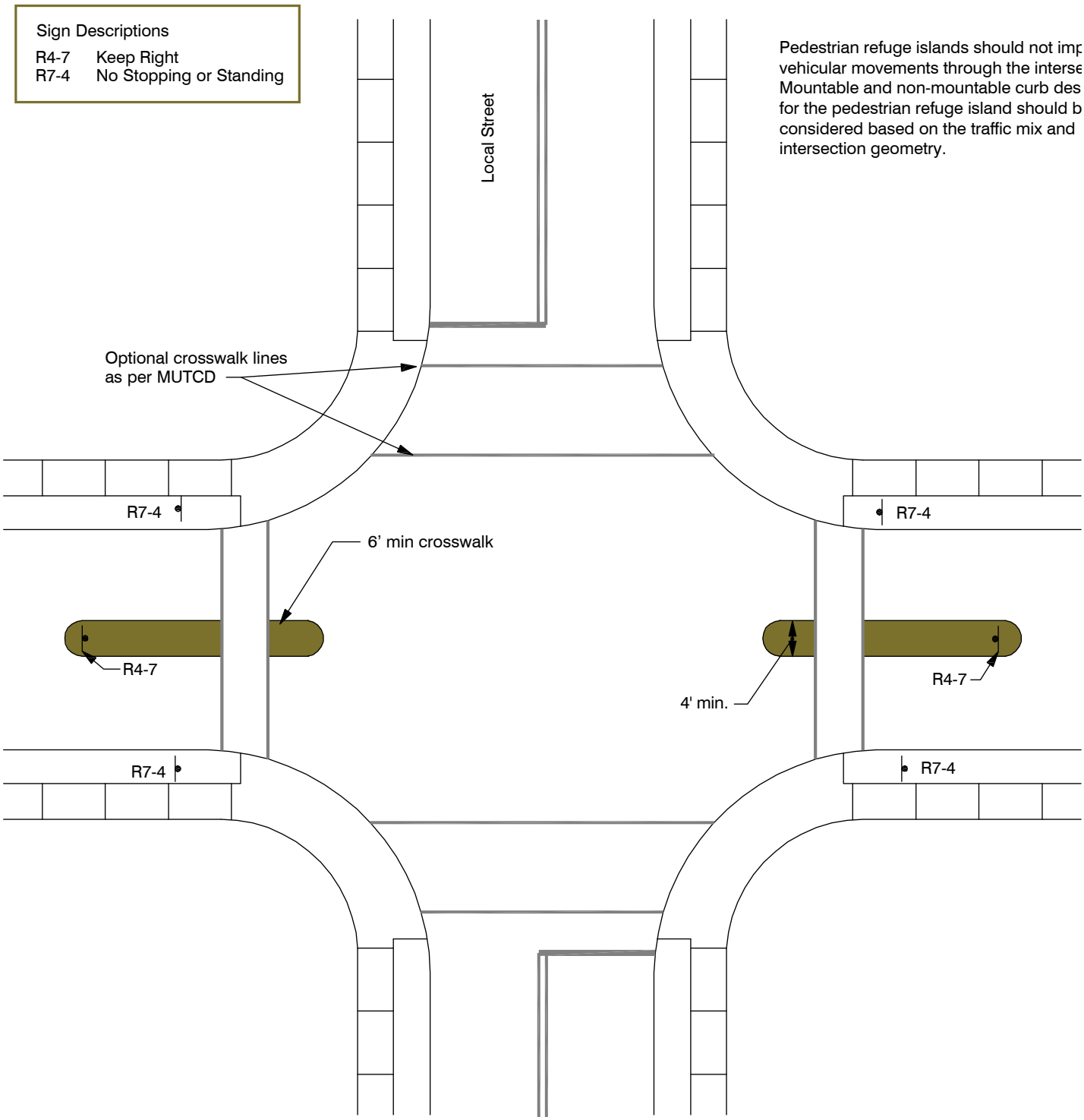


Appendix C - Design Standards

Median Barrier



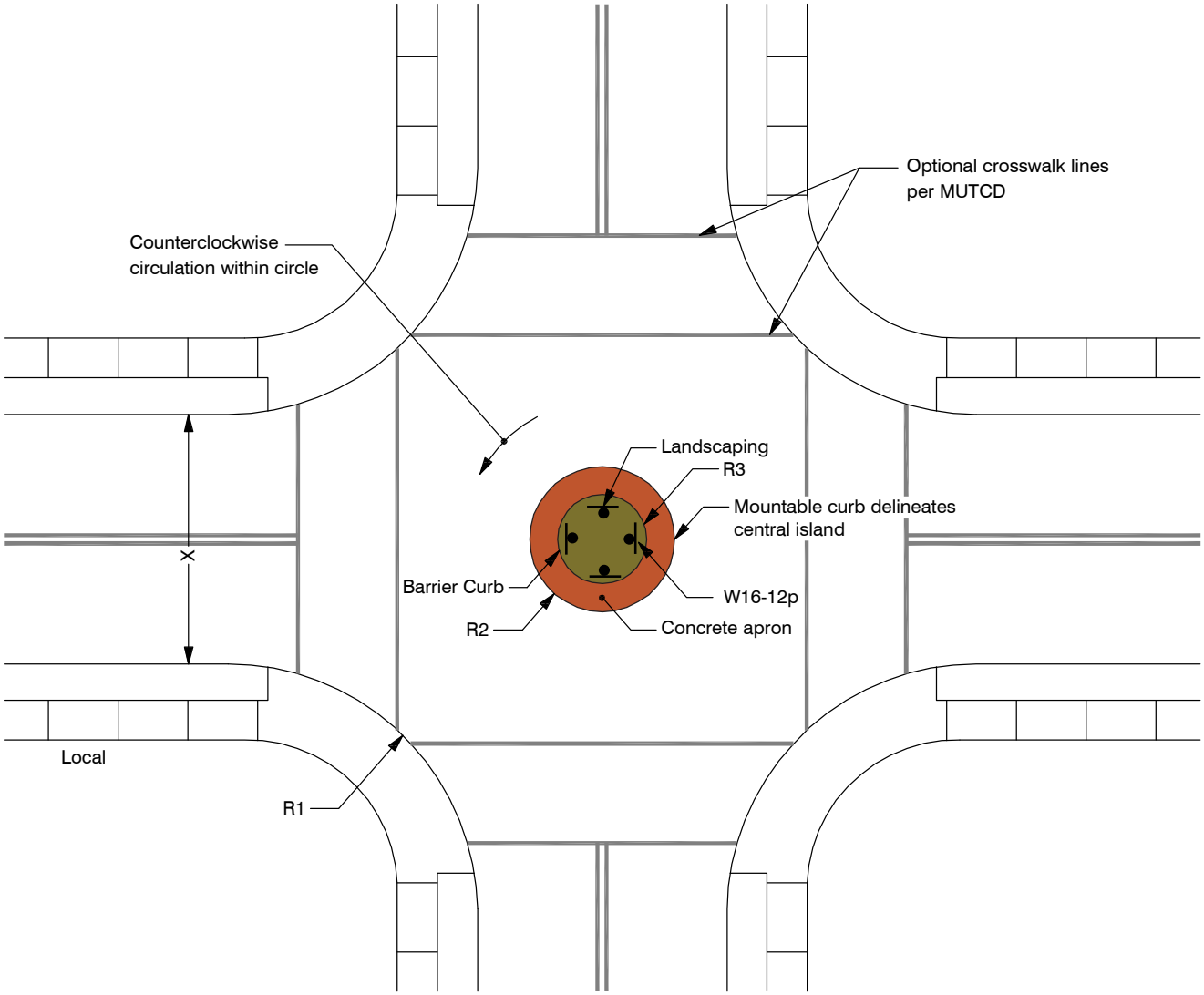
Pedestrian Refuge Island



Pedestrian refuge islands should not imp
vehicular movements through the interse
Mountable and non-mountable curb des
for the pedestrian refuge island should b
considered based on the traffic mix and
intersection geometry.

Appendix C - Design Standards

Traffic Circle



Sign Descriptions

W16-12p Traffic Circle

NOTE: 1. Assumes equal street widths; For unequal street widths, use Autoturn to ensure adequate turning radii for the desired design vehicle.

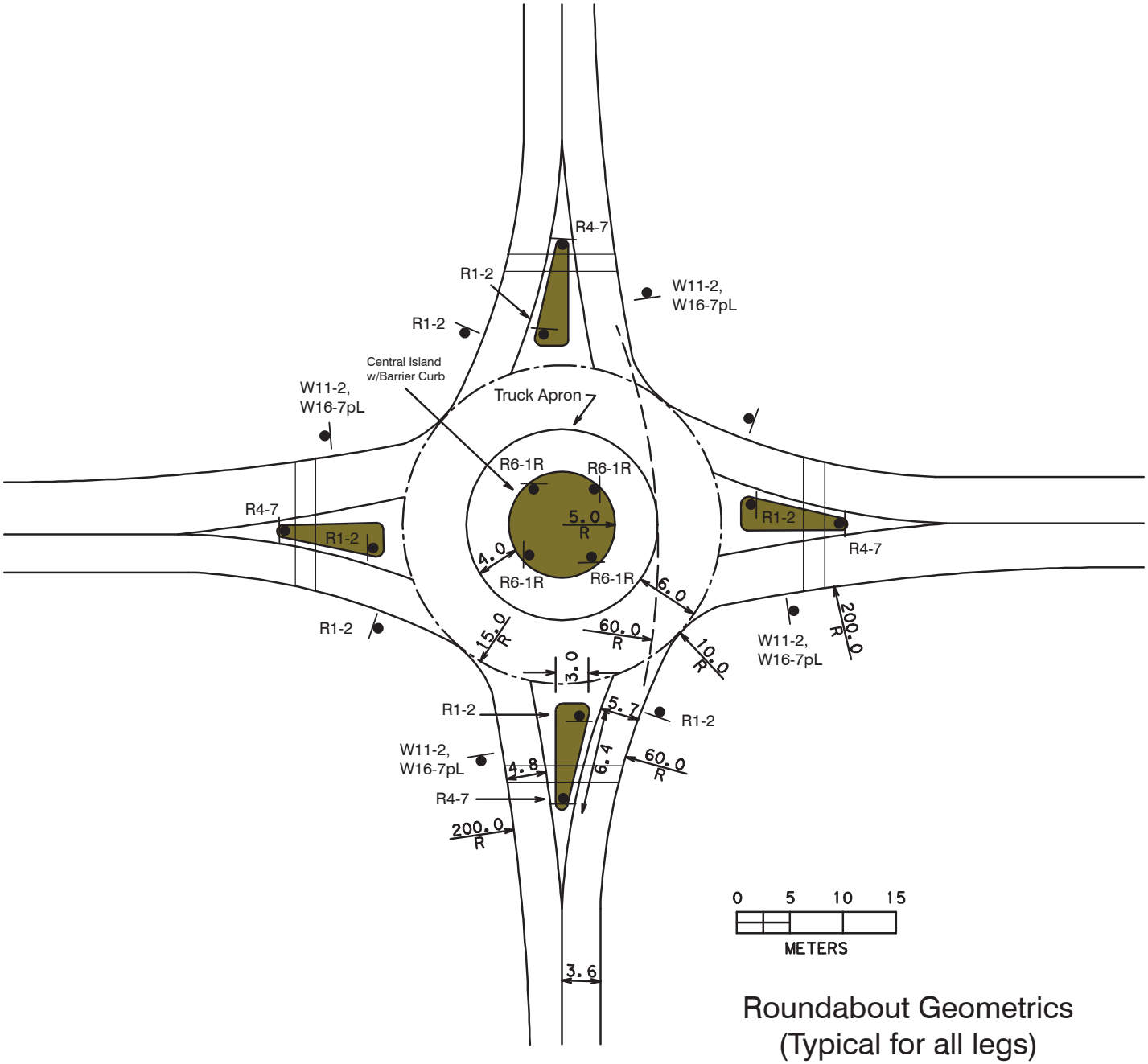
For This Street Width :	Use These Curb Radii:		
X	R1	R2	R3
34'	20'	20'	8'
	25'	24'	8'
32'	15'	12'	7'
	20'	18'	7'
	25'	20'	7'
30'	15'	11'	6'
	20'	15'	6'
	25'	16'	6'

Appendix C - Design Standards

Roundabout

This figure illustrates the minimum roudabout configuration for a 90 degree intersection of two roadways with one lane in each direction. It is designed to accommodate a WB-15 design vehicle, or automobile traffic at a 25 mph speed. This is only an example and not a recommended design. Each intersection requires thorough analysis and a unique design by a roundabout designer.

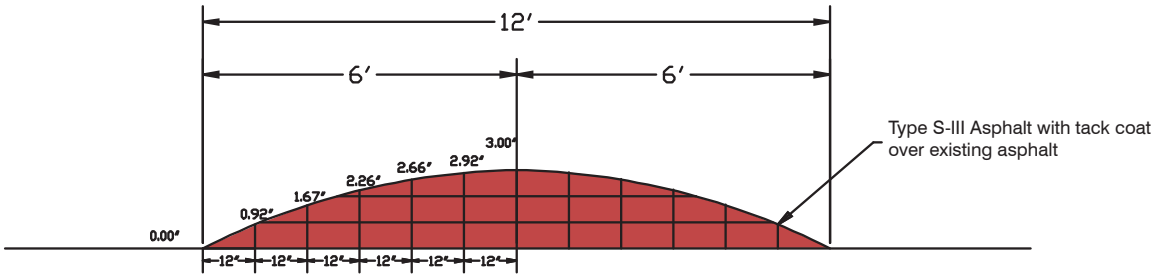
Sign Descriptions	
R1-2	Yield
W11-2	Pedestrian
W16-7pL	Arrow
R4-7	Keep Right
R6-1R	One-way



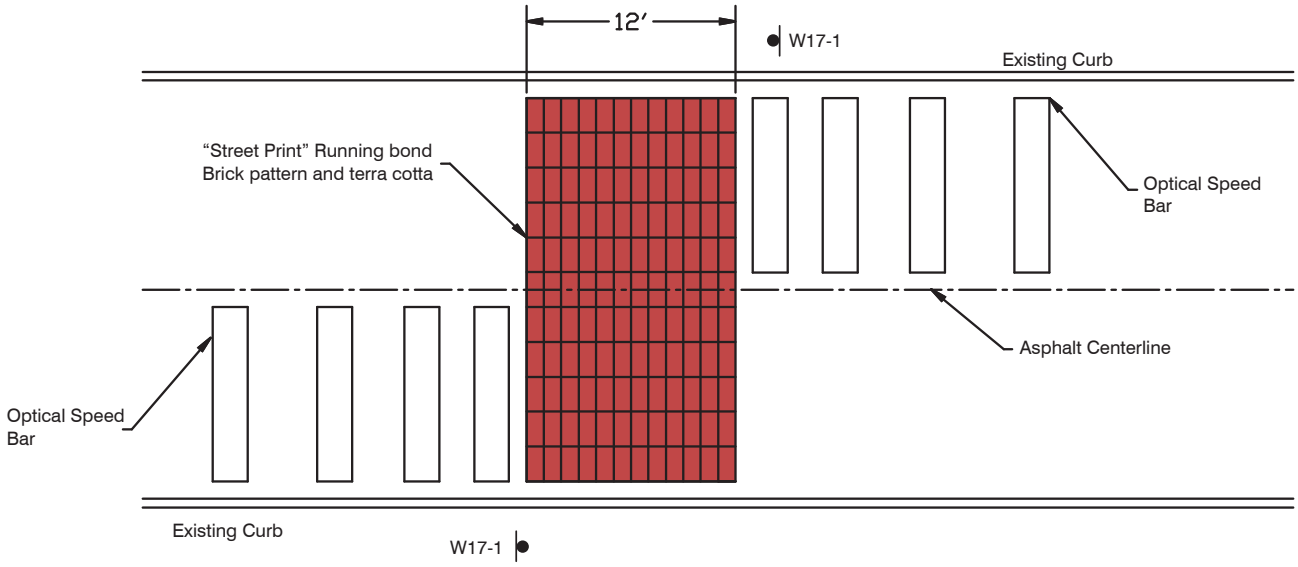
Roundabout Geometrics
(Typical for all legs)

Appendix C - Design Standards

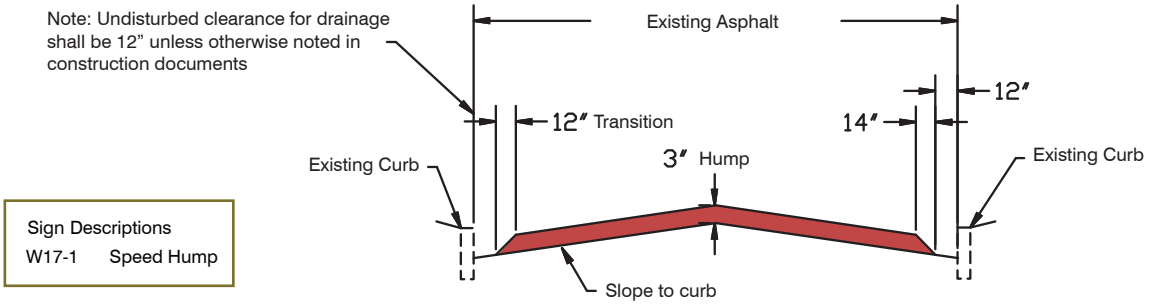
Speed Hump



Driving Profile



Plan View

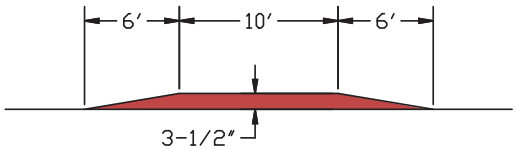


Sign Descriptions	
W17-1	Speed Hump

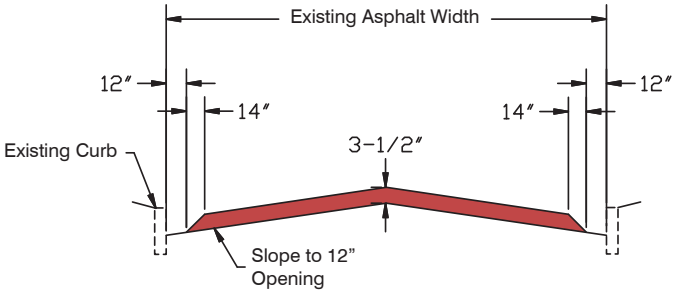
Typical Section

Appendix C - Design Standards

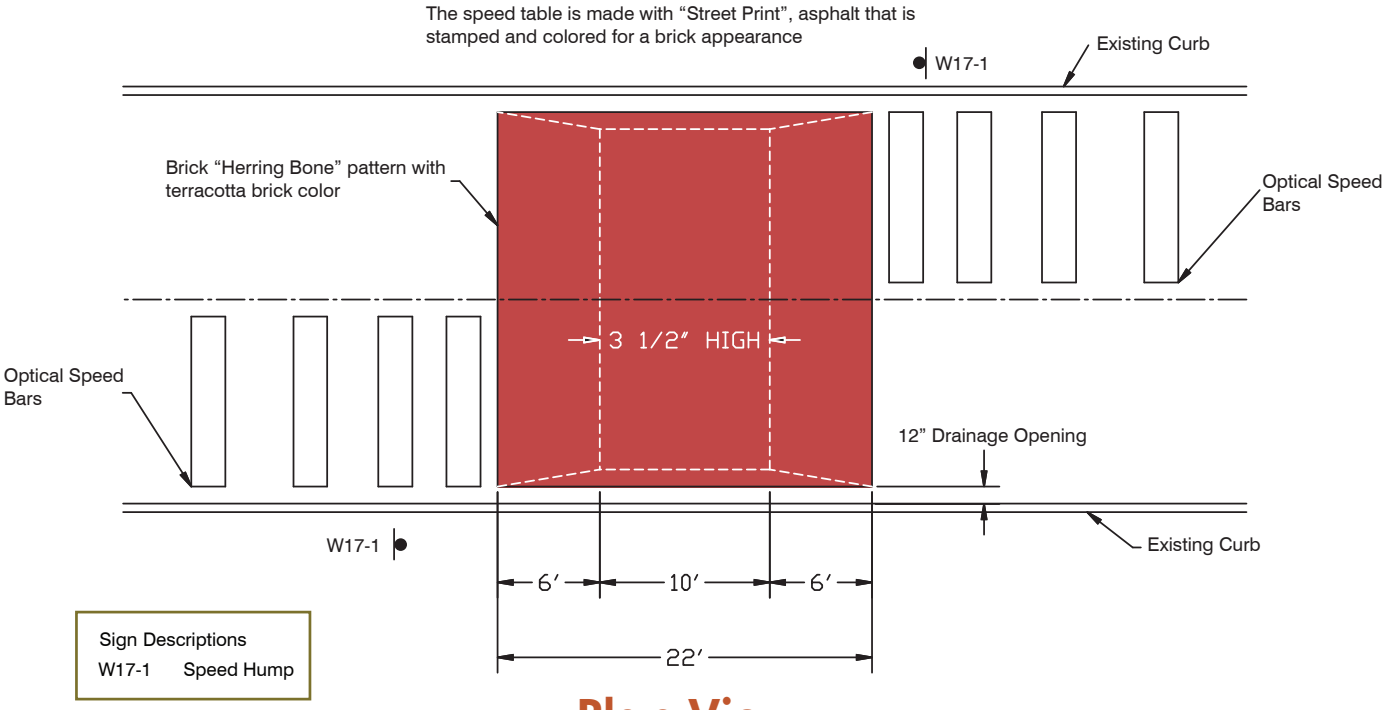
Speed Table



Driving Profile



Typical Section



Plan View

For more information contact:

Kimberly Forsyth
Senior Planner, Traffic Engineering
City of El Paso
(915) 541-4050
forsythkl@elpasotexas.gov

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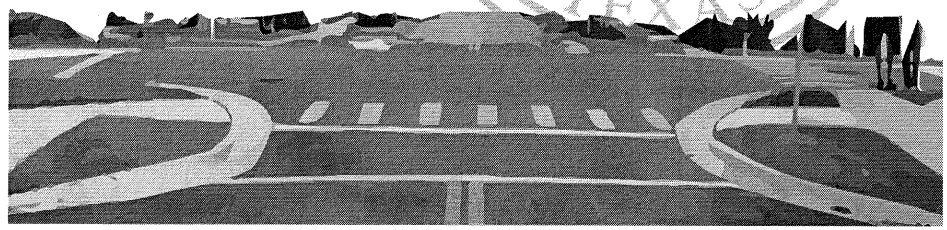
City of El Paso

Neighborhood Traffic Management Program

Citizen Guidebook



Toolbox of Traffic Calming Measures - Level III

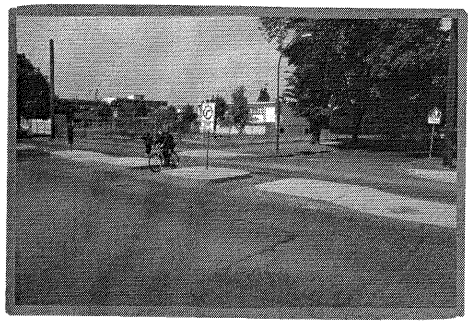
Median Barrier

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

Approximate Cost: $15,000-20,000 per 100 feet

Measured Impacts
Volume Impacts – Reduction in vehicles per day = -31%

Source: Traffic Calming: State of the Practice, 2000



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

Disadvantages
- Requires available street width on the major street
- Limits turns to and from the side street for local residents and emergency services

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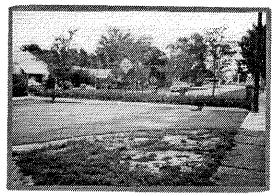
Neighborhood Traffic Management Defined 6
Neighborhood Traffic Management Program and the Transportation Network 8
Eligible But Not Preferred 10
Neighborhood Traffic Management Program Options 11
Toolbox of Traffic Calming Measures 12
Level I, II, III Measures 15
Level II, III Measures 21
Level III Measures 27

Toolbox of Traffic Calming Measures - Level III

Full Closure

Full street closures are barriers placed across a street to close the street completely to through traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car.



Approximate Cost: $30,000-100,000

Advantages
- Able to maintain pedestrian and bicycle access
- Very effective in reducing traffic volumes
- Opportunity for landscaping

Disadvantages
- Requires legal procedures for public street closures
- Causes circuitous routes for local residents and emergency services
- May be expensive
- May limit access to businesses
- Maintenance of landscaping (City vs. residents

Half Closure

Half street closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. Half closures are the most common volume control measure after full street closures. Half closures are often used in sets to make travel through neighborhoods with gridded streets circuitous, rather than direct. That is, half closures are not lined up along a border, which would preclude through movement, but instead are staggered, leaving through movement possible but less attractive than alternative routes.

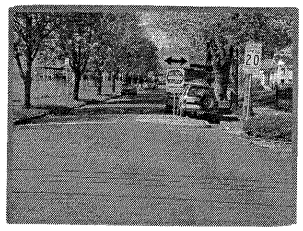
Approximate Cost: $6,500

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = -19%
Volume Impacts – Reduction in vehicles per day = -42%

Source: Traffic Calming: State of the Practice, 2000

Advantages
- Able to maintain two-way bicycle access
- Effective in reducing traffic volumes

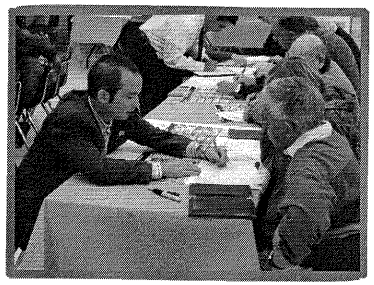
Disadvantages
- Causes circuitous routes for local residents and emergency services
- May limit access to businesses
- Drivers can circumvent the barrier



Background

Development of El Paso's Program

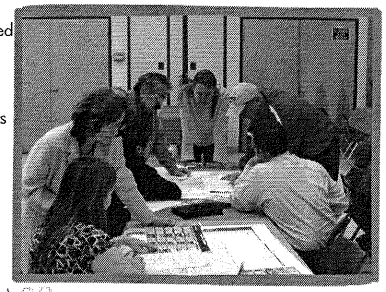
In 2005, the City implemented a Neighborhood Traffic Management Program (NTMP) to address community concerns over traffic intrusion into residential areas. This program included a preliminary set of guidelines developed internally by City of El Paso staff.



Success of this program was limited, and it was seen as difficult for citizens to use and for staff to implement. In 2007, the City appropriated funds to update the program using the transportation consulting firm of Kimley-Horn and Associates, Inc. With their experience in national best practices of traffic calming and having established neighborhood traffic management programs in communities across the country, the City was prepared to develop a state-of-the-art program.

The process began with an examination of existing conditions and public participation to identify the neighborhood traffic issues. Over six days in November 2007, City of El Paso staff and consultants conducted public meetings in all eight council districts. The meetings were arranged through each respective council representatives' staff and held in central locations open to the public. Accommodations were made for persons with disabilities. Materials were made available in Spanish, and Spanish-language translators were available. More than 100 citizens attended the meetings and gave valuable insight into the existing neighborhood traffic issues.

A final public meeting was conducted on January 18, 2008. The meeting introduced the program parameters and asked for participants input on how to fund the program and what projects should be prioritized first. The over 100 attendees were afforded time to ask questions of consultants and staff and complete a questionaire. The response of the public was enthusiastic.



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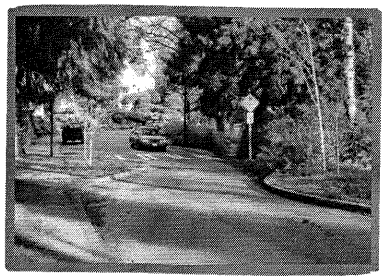
Toolbox of Traffic Calming Measures - Level II, III

Lateral Shift

Lateral shifts are curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way to the original direction of travel. Lateral shifts, with just the right degree of deflection, are one of the few measures that have been used on collectors or even arterials, where high traffic volumes and high posted speeds preclude more abrupt measures.

Approximate Cost: Varies by size of offset and length of transition



Advantages
- Can accommodate higher traffic volumes than many other traffic calming measures
- Easily negotiable by large vehicles (such as fire trucks)
- Opportunity for landscaping and street furniture

Disadvantages
- Potential loss of on-street parking
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Maintenance of Landscaping

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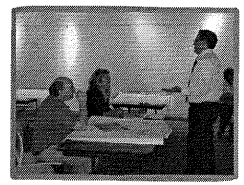
Neighborhood Traffic Management Elements

The problems of cut-through traffic, speeding, security, and aesthetics can be addressed in El Paso with a NTMP that utilizes the three "E's" — Education, Enforcement, and Engineering.

Education

Neighborhood traffic management studies have shown that often the residents themselves contribute to the perceived speeding problem within the neighborhood. The most effective NTMPs begin with residents education about the need to obey speed limits and yield to pedestrians. Engineering measures alone will not produce satisfactory results.



Enforcement

Intensified enforcement of traffic regulations can calm traffic, generally by reminding drivers of posted speed limits and enforcing the observance of stop signs. Police officers are the usual source of intensified enforcement, but neighborhood volunteers can also prove effective in this area.

Engineering

Engineering solutions physically modify the roadway in some manner to encourage drivers to alter their behavior by reducing speed, raising awareness of pedestrians and bicyclists, or diverting traffic to a more appropriate street. These engineering solutions, typically called traffic calming, are often intended to be "self-enforcing" and are performed after education and enforcement activities.

Traffic Calming Defined

Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability and other public purposes. Traffic calming measures can be separated into two groups based on the main impact intended.

Non-physical measures include education and enforcement initiatives. They also include engineering measures that are relatively low in cost and simple in their implementation. These engineering measures could be signing, striping, curb marking, changes in signal timing, and improvement in street lighting.

Physical measures physically modify the roadway to address cut-through traffic problems by blocking certain movements, thereby diverting traffic to streets better able to handle it. Physical measures also address speeding problems by changing vertical or horizontal alignment, or narrowing the roadway.

Toolbox of Traffic Calming Measures - Level II, III

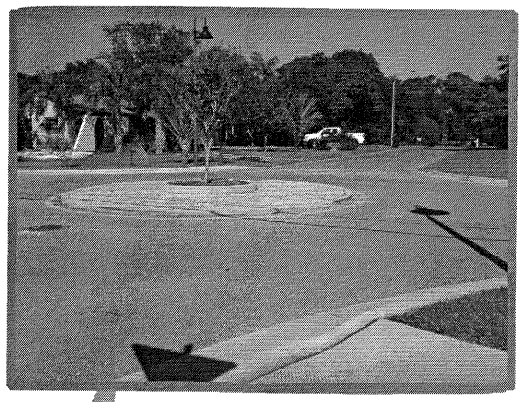
Traffic Circle

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are usually circular in shape and landscaped in their center islands, though not always. Traffic controls at the approaches vary by location. Circles prevent drivers from speeding through intersections by impeding the straight-through movement and forcing drivers to slow down to yield. Drivers must first turn to the right, then to the left as they pass the circle, and then back to the right again after clearing the circle.

Approximate Cost: $10,000

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = -11%
Volume Impacts – Reduction in vehicles per day = -5%
Safety Impacts – Reduction in average annual number of collisions = -71%

Source: Traffic Calming: State of the Practice, 2000



Advantages
- If designed well, can have positive aesthetic value
- Very effective in moderating speeds and improving safety
- Opportunity for landscaping

Disadvantages
- Difficult for large vehicles (such as fire trucks) to circumnavigate
- Must be designed so that the circulating lane does not encroach on crosswalks
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

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Neighborhood Traffic Management Program and the Transportation Network

Local and collector streets are eligible for NTMP. Roadway functions are explained below for your information.

The design of a street is usually determined by the different demands that each transportation mode requires. Within El Paso, each street is specifically classified to accommodate certain traffic volumes and speeds in conjunction with the principle uses. Street classifications define the function of each street and the standard to which it should be designed and used. Many factors determine a street's classification, including travel demand, right-of-way, required street width, maintenance costs, access needs, safety, preservation of property, adjacent land uses, and connections to the greater transportation network.

Basically, there are four functional classifications for the streets and roadways in El Paso:

Local Streets

The function of local streets in the City's transportation network is to provide direct access into residential neighborhoods and to provide travel within neighborhoods. The usual speed limit for local streets is 30 mph, as set by Texas State Law. Much of the emphasis of the NTMP will apply to the local streets. However, all recommended mitigation measures will be evaluated for their consistency with standard traffic engineering, safety standards and practices on a case-by-case basis. Some recommendations may not be acceptable.

Collector Streets

The function of collector streets is to carry traffic between local streets and arterial streets. Collector streets are designed to carry higher volumes of traffic, serve greater uses, and accommodate higher vehicle speeds. El Paso's collector streets can carry up to 15,000 ADT (Average Daily Traffic). Speeds on collector streets can vary from 30 mph to 40 mph. Because of their vital role as traffic connectors in the City's transportation network, many of the measures in the NTMP Toolkit will not be applicable to collector streets.

Arterial Streets

The function of arterial streets and roadways is to carry larger volumes of traffic at relatively higher speeds, with minimal delay. Most collector streets connect with arterial roadways, as they direct traffic through the network. Arterial streets in El Paso carry up to 50,000 ADT and are crucial to circulation throughout the City. Speed limits on arterial roadways in El Paso are typically set between 35 mph and 45 mph. Arterial streets are generally not suitable for NTMP applications.

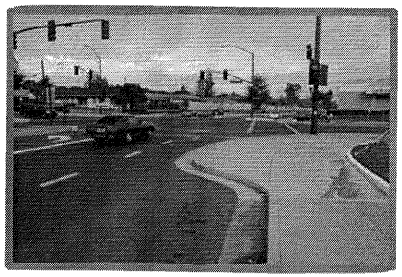
Freeways and Interchanges

The function of freeways and interchanges is to connect El Paso's transportation network to the greater regional transportation system. Freeways and interchanges are maintained by TxDOT and are unavailable for NTMP measures.

Toolbox of Traffic Calming Measures - Level II, III

Bulbouts

Bulbouts (neckdowns, intersection narrowings, safe crosses, etc.) are curb extensions that reduce roadway width curb to curb at either midblock or intersection locations. Midblock treatments narrow the travel lane but do not provide additional sidewalk width. Intersection treatments reduce vehicle travel speeds by tightening curb radii and improve pedestrian safety by shortening crossing distance.



Intersection treatments can be retrofit into an existing intersection without modifying the existing drainage, or they can be designed to provide additional sidewalk width for increased pedestrian use or street furniture. The effects are increased pedestrian comfort and safety at the intersection.

Approximate Cost: $2,000-5,000 for four corners (without drainage modifications) or $25,000 per corner with full drainage modifications

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%
Volume Impacts – Reduction in vehicles per day

Source: Traffic Calming: State of the Practice, 2000

Advantages
- Improves pedestrian circulation and standing space on sidewalk area
- Through and left-turn movements are easily negotiable by large vehicles
- Creates protected on-street parking bays
- Reduces speeds (especially right-turning vehicles) and traffic volumes
- Provides opportunity for landscaping and street furniture

Disadvantages
- Effectiveness is limited by the absence of vertical or horizontal deflection
- May slow right-turning emergency vehicles
- Potential loss of on-street parking
- May require bicyclists to briefly merge with vehicular traffic

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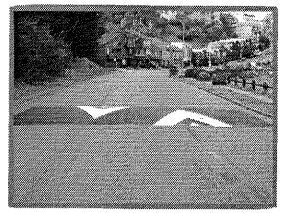
Eligible But Not Preferred

Speed Hump

Speed humps and tables are not practical mitigation measures on all streets and roadways. Generally, speed humps and tables are designed for local neighborhood roadways with specific traffic volumes, vehicle speeds and residential frontages.

Speed humps are wave-shaped paved humps in the street. The height of the speed hump determines how fast it can be navigated without causing discomfort to the driver. Discomfort increases as the speed over the hump increases.

Approximate Cost: $2,000



Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -22%
Volume Impacts – Reduction in vehicles per day = -18%

Source: Traffic Calming: State of the Practice, 2000

Advantages
- Slows traffic immediately.
- Self-enforcing.

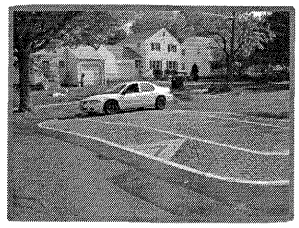
Disadvantages
- Greatly increases response time for emergency vehicles.
- Motorists tend to speed up between humps.
- Increases noise and pollution in neighborhood.

Speed Table

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

Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

Approximate Cost: $2,500



Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = -18%
Volume Impacts – Reduction in vehicles per day = -12%

Source: Traffic Calming: State of the Practice, 2000

Advantages
- They are smoother on large vehicles (such as fire trucks) than Speed Humps
- They are effective in reducing speeds, though not to the extent of Speed Humps

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

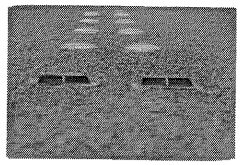
Toolbox of Traffic Calming Measures - Level I, II, III

Raised Pavement Markers

Raised reflectors lining the centerline and/or edgeline of a roadway add a visual queue to the driver to not deviate outside of the proper lane. Raised reflectors also improve the nighttime visibility of roadways.

Raised pavement markers can also be arranged in a rectangular array across the roadway, creating a rumble strip. These can be effective in reducing travel speeds but also increase roadway noise considerably. Consequently, rumble strips are only recommended for placement in very low density areas.

Approximate Cost: $4.50 per marker



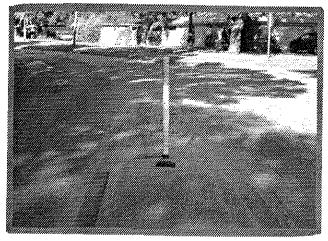
Advantages
- Inexpensive
- Does not slow trucks, buses, and emergency vehicles
- Queues drivers to respect lanes on curves and under low visibility conditions

Disadvantages
- Increased noise
- Increased maintenance

Delineator

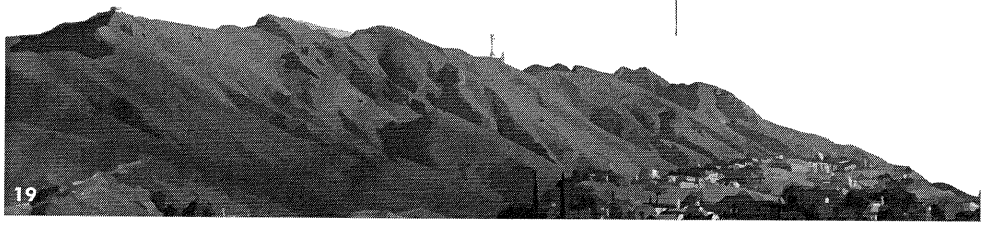
Much like raised pavement markers, delineators may be used to further define a centerline and/or edgeline of a roadway. Moreover, delineators add a vertical element to the roadway. Delineators can also be used with physical measures found in Level II to further improve their traffic calming effectiveness.

Approximate Cost: $45 per Delineator



Advantages
- Inexpensive
- Reduction in 85th percentile speed
- Does not slow buses and emergency vehicles
- Does not require time for design

Disadvantages
- Increase maintenance
- Decreased aesthetics



Toolbox of Traffic Calming Measures

The NTMP is a three-level program. Level I focuses on informing and educating residents regarding traffic calming features and providing the neighborhood with tools for resolution and documentation of traffic problems. Level I measures should be thoroughly explored and implemented before implementing Level II. If the traffic issue still exists after the first level then more restrictive physical devices can be considered for recommendation and implementation. Level II addresses problems that require permanent and more costly traffic control solutions. Level III includes all measures in Level I and II and adds additional street closure measures. Level III is only available to the "neighborhood" process.

Level I "Express" Non-Physical Measures

Purpose
- Response to individual complaints or other's observations

Request process
- Individual, no petition needed

Study
- Visual inspection during peak time. Traffic counts if needed.

Implementation and Monitoring
- Measures can be implemented using permanent or temporary traffic calming measures. If temporary measures are selected, they should be installed and monitored for a period of three to six months.

Project prioritization
- First-come, first-serve basis typically completed in 1 to 6 months.

Level II "Express" Physical Measures

Purpose
- Response to individual complaints, block or street-long complaints, or other's observations

Request process
- Petition of two-thirds of households on street

Study
- Speed and volume traffic counts and visual inspection

Implementation and Monitoring
- Measures can be implemented using permanent or temporary traffic calming measures. If temporary measures are selected, they should be installed and monitored for a period of three to six months.

Project prioritization
- Request are prioritized twice per year based-upon the adjacent project selection criteria. Applicants will be provided a date for which they will be informed of their project ranking.

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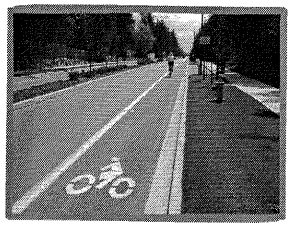
Toolbox of Traffic Calming Measures - Level I, II, III

Lane Striping

Lane striping can be used to create formal bicycle lanes, parking lanes, or simple edge lines. As a traffic calming measure, they are used to narrow the travel lanes for vehicles to encourage drivers to lower their speeds. The past evidence on speed reductions is, however, inconclusive.

Approximate Cost: $1 per linear foot



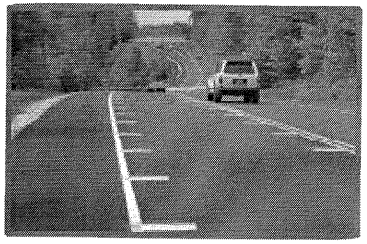
Advantages
- Inexpensive
- Can be used to create bicycle lanes or delineate on-street parking
- Does not require time for design
- Does not slow emergency vehicles

Disadvantages
- Has not been shown to significantly reduce speeds
- Increased regular maintenance

Optical Speed Bars

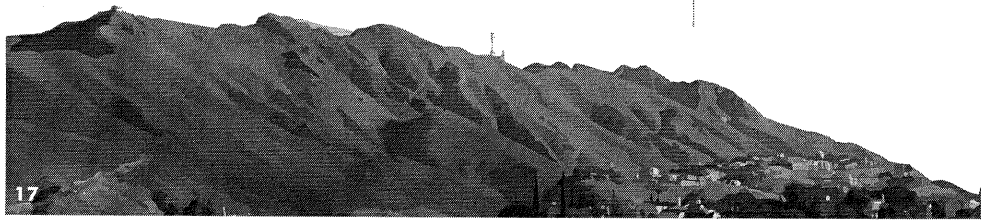
Optical speed bars are a series of pavement markings spaced at decreasing distances. They have typically been used in construction areas to provide drivers with the impression of increased speed.

Approximate Cost: $1 per linear foot



Advantages
- Inexpensive
- Reduction in 85th percentile speed
- Does not slow bus and emergency vehicles
- Does not require time for design

Disadvantages
- Effectiveness diminishes after repeated use
- Aesthetics



Toolbox of Traffic Calming Measures

Toolbox of Traffic Calming Measures

The following traffic calming measures constitute the standard toolbox of devices available to citizens and Traffic Engineering staff when developing neighborhood traffic management plans. The devices are divided into the following types:

Level I Measures
- Non-physical measures

Level II Measures
- Narrowing measures
- Horizontal deflection measures

Level III Measures
- Non-physical measures
- Narrowing measures
- Horizontal deflection measures

Level III phase II Measures
- Diversion measures

For each non-physical and physical measure in the toolbox, a description, photograph, list of advantages and disadvantages, and approximate cost are provided.

Types of Measures	Type of Problem: Speeding	Traffic Volume	Vehicle Accidents	Pedestrian Safety	Noise
Level I Non-Physical Measures					
Targeted Speed Enforcement	★	○	●	●	●
Radar Trailer	★	○	○	○	●
Speed Feedback Signs	★	○	○	○	●
Edgeline / Centerline Striping	●	○	○	○	○
Optical Speed Bars	●	○	○	○	○
Speed Limit Signage	★	○	○	○	○
Speed Legends	★	○	○	○	○
Truck Restriction Signs	○	●	○	○	★
"Cross Traffic Does Not Stop" Signage	○	○	★	●	○
Raised Pavement Markers	○	○	★	●	○
High-Visibility Crosswalks	●	○	○	★	○
Angled Parking	★	●	○	○	○
Level II Narrowing Measures					
Bulbouts	★	○	○	★	○
Two-Lane Chokers	★	○	○	○	○
Center Island Narrowings / Pedestrian Refuges	★	○		★	○
Level II Horizontal Measures					
Traffic Circles	★	●	★	●	○
Roundabouts (Single-Lane)	●	●	★	○	★
Lateral Shifts	●	●	○	○	○
Chicanes	★	●	○	○	○
Speed Table	★	●	X	●	X
Speed Hump	●	●	X	X	X
Level III Measures					
Full Closures	★	★	○	○	○
Half Closures	★	★	○	○	○
Diagonal Diverters	★	★	○	○	○
Median Barriers	○	★	○	○	○
Forced Turn Islands	○	★	●	○	○

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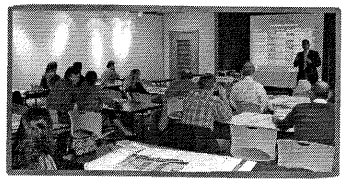
Toolbox of Traffic Calming Measures - Level I, II, III

Education

Activities that change people's perceptions and help alter driver behavior are most preferred. Meetings and workshops with neighbors and City staff can help implement and direct NTMP applications. Most traffic problems are a result of human behavior. Through outreach programs and neighborhood watch programs, all residents can play a big part in spreading the information.

Approximate Cost: Varies



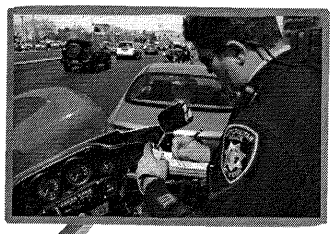
Advantages
- Education can be flexible in duration
- Everyone can afford it

Disadvantages
- May be difficult to measure its effectiveness
- May take time to be effective

Targeted Speed Enforcement

The Traffic Division identifies locations for temporary targeted enforcement enhancements, based on personal observations and survey comments. A request is then submitted to the Police Department for the desired enforcement. Because of limited citywide resources, the targeted enforcement will not be continued indefinitely. Targeted enforcement may also be used in conjunction with new traffic calming devices to help drivers become aware of the new restrictions.

Approximate Cost: Varies



Advantages
- Inexpensive if used temporarily
- Does not require time for design
- Does not slow trucks, buses, and emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages
- Expensive to maintain an increased level of enforcement
- Effectiveness may be temporary

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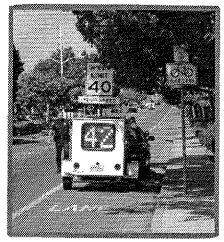
Toolbox of Traffic Calming Measures - Level I, II, III

Radar Trailer

A radar trailer is a device that measures each approaching vehicle's speed and displays it next to the legal speed limit in clear view of the driver, reminding speeding drivers to slow to the speed limit. They can be easily placed on a street for a limited amount of time then relocated to another street, allowing a single device to be effective in many locations.

Approximate Cost: $6,000 - $20,000



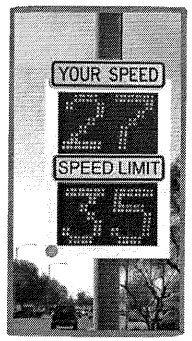
Advantages
- Inexpensive if used temporarily
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in the short-run

Disadvantages
- Effectiveness may be temporary
- Aesthetics
- Only effective for one direction of travel
- Subject to vandalism

Speed Feedback Signs

Speed feedback signs perform the same functions as radar trailers but are permanent. Real-time speeds are relayed to drivers and flash when speeds exceed the limit. Speed feedback signs are typically mounted on or near speed limit signs and can also be mobile units. They are especially effective near schools and parks.

Approximate Cost: $3,300 - $4,200



Advantages
- Inexpensive
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages
- Requires power source
- Only effective for one direction of travel
- Long-term effectiveness uncertain
- Subject to vandalism

Toolbox of Traffic Calming Measures

Level III "Neighborhood" Traffic Management Plan

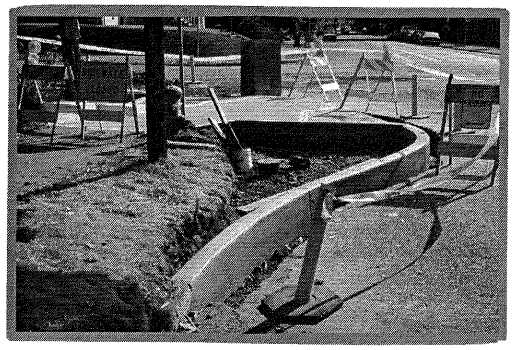
Purpose
A comprehensive approach to neighborhood traffic management

Request process
Neighborhood Association Petition or Council Representative Commitment

Study
Speed and volume traffic counts, visual inspection, simulations, and photo morphing.

Implementation and Monitoring
Measures must be implemented using permanent traffic calming measures. Monitoring should be done within three to six months of installation.

Project prioritization
On an annual basis a call for projects will be announced to the community. The call for projects will have a sixty-day filing period to provide an equal opportunity for all interested residents to submit their completed form. At the close of the filing period, a selection criteria will determine the order of applicants. the Traffic Division will continuously accept NTMP Request Forms after the initial filing period, but will not rank them until the following year.



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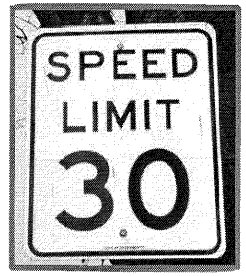
Toolbox of Traffic Calming Measures - Level I, II, III

Signage

Signage can be an effective tool for advising drivers of
- speed limits,
- truck restrictions, and
- cross traffic that does not stop.

Approximate Cost: $200 per sign

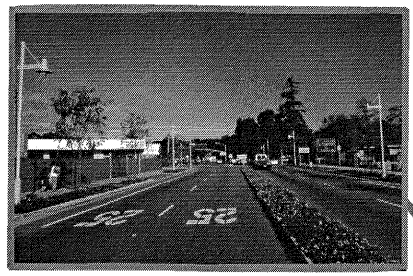


Advantages
- Inexpensive
- Does not require time for design
- Turn restrictions can reduce cut-through traffic
- Does not significantly slow emergency vehicles

Disadvantages
- Speed limit signs are ineffective if unaccompanied by increased police enforcement
- If speed limit is set unreasonably low, drivers are more likely to exceed it

Speed Legends

Speed legends are numerals painted on the roadway, indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts. Speed legends can be useful in reinforcing a reduction in speed limit between one segment of a roadway and another segment. They may also be placed at major entry points into a residential area.



Advantages
- Inexpensive
- Helps reinforce a change in speed limit
- Does not require time for design
- Does not slow emergency vehicles

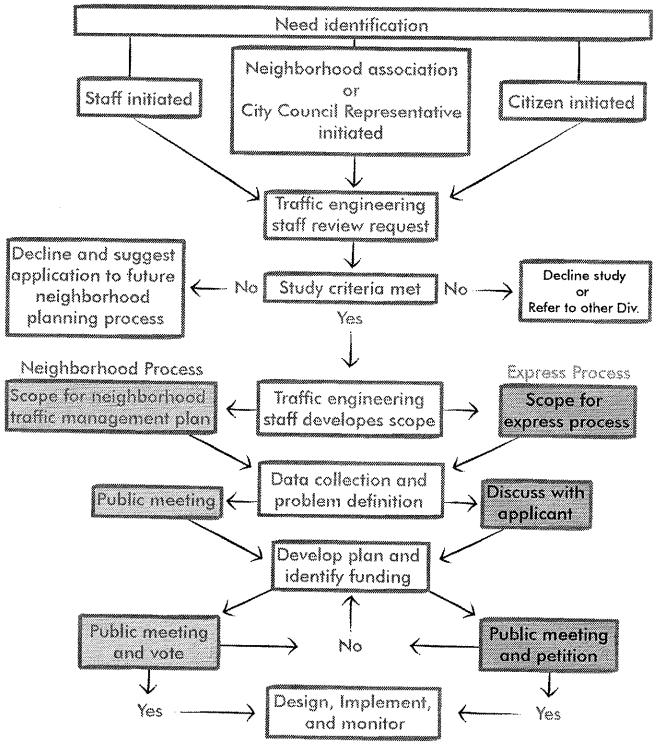
Disadvantages
- Has not been shown to significantly reduce travel speeds

Neighborhood Traffic Management Program Options

Will traffic calming work in my neighborhood?

The NTMP is a three-level program with two options for implementing the program. The "express" process is available to address dangerous traffic situations that need immediate attention. This process requires less citizen participation, therefore less time to implement, but results may not be in keeping with neighborhood values and desires. The "neighborhood" process is a comprehensive approach to solving traffic issues at a scale larger than a single street. Typically, this process will study an area of less than a square mile and will require extensive citizen participation in devising solutions to traffic issues.

Most NTMP requests will begin with the "express" process. The "neighborhood" process can be requested, or staff may recommend it based upon the complexity of the issues defined and the time frame needed to resolve them. The chart below describes the general flow of a NTMP request.

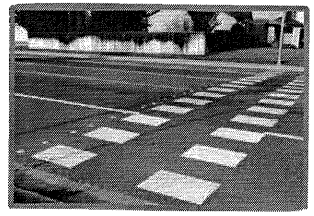


Toolbox of Traffic Calming Measures - Level I, II, III

High Visibility Cross Walk

Using special pavement marking patterns and raised reflectors increases the visibility of a crosswalk. The "triple four" marking pattern is an effective manner to increase the visibility of a crosswalk with typical painting materials. The unpainted space along the center of the crosswalk allows pedestrians and those in wheelchairs to cross in the rain without the sliding problems found on typical crosswalks that engross the entire crossing area.

Approximate Cost: $2,000



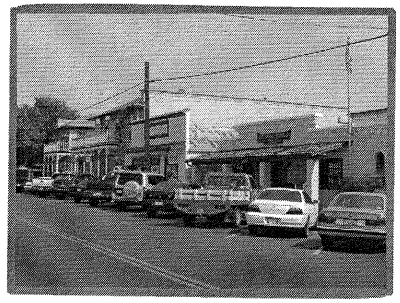
Advantages
- Inexpensive
- Does not slow buses and emergency vehicles

Disadvantages
- Effectiveness diminishes after repeated use

Angled Parking

Angled parking reorients on-street parking spaces to a 45-degree angle, increasing the number of parking spaces and reducing the width of the roadway available for travel lanes. Angled parking is also easier for vehicles to maneuver into and out of than parallel parking. Consequently, it works well in locations with high parking demand, such as multi family, commercial, and mixed-use areas.

Approximate Cost: $250- $300 per stall



Advantages
- Reduces speeds by narrowing the travel lanes
- Increases the number of parking spaces
- Makes parking maneuvers easier and takes less time than with parallel parking
- Favored by businesses and multi family residences

Disadvantages
- Precludes the use of bike lanes (unless roadway is wider than 58 feet)
- Ineffective on streets with frequent driveways
- May be incompatible with one-way streets approaching a two-way segment

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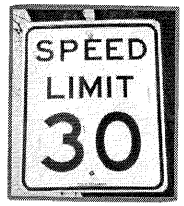
Neighborhood Traffic Management Program and the Transportation Network

Modifications to speed limits and the addition of stop signs or traffic signals are not available through the NTMP. The warrants for these devices are explained below.

Speed Limits

Speed limits for collector and arterial roadways are established based upon recognized engineering criteria related to roadway design. Some of the criteria includes:

- Street width
- Lane width
- Sight distance
- The 85th percentile speed (critical speed)



By State statute, local streets, as defined by the vehicle code, have a 30 mph speed limit. Close proximity to sources of pedestrian usage such as schools and parks may be cause for a lower speed limit.

Stop Signs

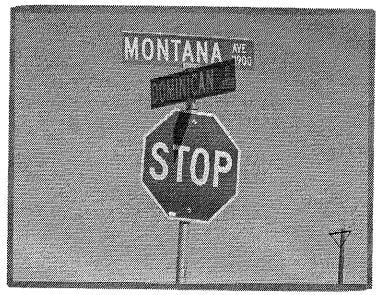
The City of El Paso does not install stop signs as part of the NTMP. The federal *Manual on Uniform Traffic Control Devices* (MUTCD) which is the recognized authority, states that "Stop Signs shall not be used for speed control." It has been the City's experience that unwarranted stop signs do not make effective traffic calming devices for the following reasons:

- Drivers generally tend to make up the time lost at an unwarranted stop sign by speeding up between signs.
- Stop signs also increase the noise and pollution level in a neighborhood from cars decelerating to stop, then accelerating.
- Drivers tend to run unwarranted stop signs once they notice no traffic in the opposing directions.

Stop signs are installed at locations where right-of-way assignment is required due to a large number of vehicles entering the intersection from all directions.

The following is a procedural list for stop sign traffic control:

1. Residents request for right-of-way management.
2. Analysis is performed, which includes traffic volume counts, pedestrian volume, accident history, sight distance, and on-site observations.
3. If the intersection meets necessary requirements (warrants), then stop sign traffic control is usually recommended.
4. Recommendations for the installation of stop signs at unwarranted locations would need to be forwarded to the to City Council for final approval.



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Toolbox of Traffic Calming Measures - Level II, III

Two-Lane Choker

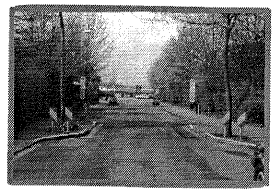
Chokers are curb extensions at mid-block that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also called safe crosses.

Chokers leave the street cross section with two lanes that are narrower than the normal cross section.

Approximate Cost: $5,000-10,000

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%
Volume Impacts – Reduction in vehicles per day = -10%

Source: Traffic Calming: State of the Practice, 2000



Advantages
- Easily negotiable by large vehicles (such as fire trucks)
- If designed well, can have positive aesthetic value
- Reduces both speeds and volumes
- Opportunity for landscaping

Disadvantages
- Effect on vehicle speeds is limited by the absence of any horizontal deflection
- May require bicyclists to briefly merge with vehicular traffic
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

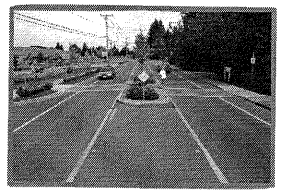
Center Island Narrowing/Pedestrian Refuge Island

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

Approximate Cost: $6,000-9,000

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = -7%
Volume Impacts – Reduction in vehicles per day = -10%

Source: Traffic Calming: State of the Practice, 2000



Advantages
- Increases pedestrian safety
- If designed well, can have positive aesthetic value
- Reduces traffic volumes
- Opportunity for landscaping

Disadvantages
- Effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Neighborhood Traffic Management Participants / Stakeholders

The NTMP is designed to enhance communication and understanding between the City and its residents.

Citizen Involvement

1. Identify need for NTMP
2. Attend and participate in NTMP public meetings
3. Participate in NTMP education activities
4. Encourage neighbors to participate in NTMP initiatives
5. Vote or petition for sound NTMP solutions
6. Support bond referendums that include NTMP funding

El Paso City Staff

1. Review and respond to NTMP requests
2. Conduct appropriate traffic and warrant studies
3. Recommend appropriate traffic calming options to the City Council and Citizens
4. Maintain NTMP log sheet
5. Initiate implementation of approved traffic calming measures
6. Provide program status reports
7. Provide a process for citizen feedback

El Paso City Council

1. Review and approve the Policies and Procedures for the NTMP
2. Review and approve complex or controversial NTMP recommendations
3. Provide an appeal process for denied NTMP requests
4. Allocate resources and funding guidance
5. Approve annual NTMP budget

Street Eligibility

The NTMP and its associated traffic calming measures can be applied to any local or collector level street. The next section explains further what streets and traffic calming tools are applicable.

Toolbox of Traffic Calming Measures - Level II, III

Roundabout

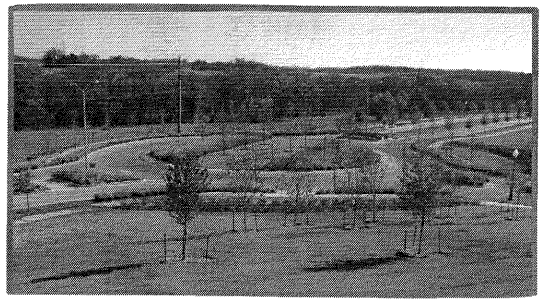
Like traffic circles, roundabouts require traffic to circulate counterclockwise around a center island. But unlike circles, roundabouts are used on higher volume streets to allocate rights-of-way among competing movements. They are found primarily on arterial and collector streets, often substituting for traffic signals or all-way stop signs. They are larger than neighborhood traffic circles and typically have raised splitter islands to channel approaching traffic to the right.

Approximate Cost: $100,000-$200,000 for retrofits; $100,000 for a single lane and $150,000 for two lanes in new developments

Measured Impacts

Speed Impacts – Reduction in 85th percentile speeds between slow points = I/D
Volume Impacts – Reduction in vehicles per day = I/D
Safety Impacts – Reduction in average annual number of collisions = -15% to 33%
Notes: I/D = Insufficient Data

Source: Traffic Calming: State of the Practice, 2000



Advantages

- Moderates traffic speed on an arterial
- Enhanced safety compared to a traffic signal
- Minimizes queuing at approaches to the intersection
- Less expensive to operate than traffic signals
- Provides opportunity for landscaping and street furniture

Disadvantages

- May require major reconstruction of an existing intersection
- Loss of on-street parking
- Increases pedestrian distance from one crosswalk to the next
- Difficult for visually impaired pedestrian to navigate
- Maintenance of landscaping (City vs. residents)

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Background

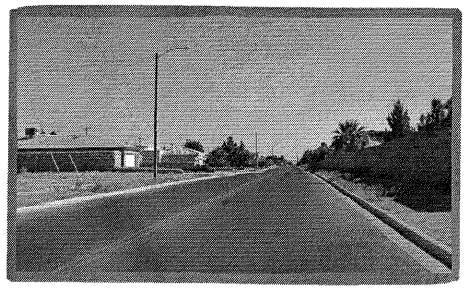
Input from the public meetings helped to define the neighborhood traffic conditions in El Paso:

Cut-Through Traffic
Cut-through traffic has neither its origin nor destination within a neighborhood, but rather is passing through a neighborhood on local streets.

Speeding
Many motorists (neighborhood residents as well as "cut-throughs") drive too fast on local streets. While some speeding is done by irresponsible drivers, the majority is done by normally responsible drivers who find themselves "invited" to speed by the road's design features, such as excessively wide pavement, straight sections of road, and absence of vegetation.

Security
Excessive traffic speeds are a threat to neighborhood security and cause residents to retreat into their homes, essentially abandoning the street to vehicles.

Aesthetics
Wide expanses of pavement devoted solely to the movement of traffic and storm water dominate the landscape in El Paso.



Other Issues
Parking, arterial street access and performance; design of school zones; and transit stop locations were also recognized as isolated issues specific to some El Paso neighborhoods.

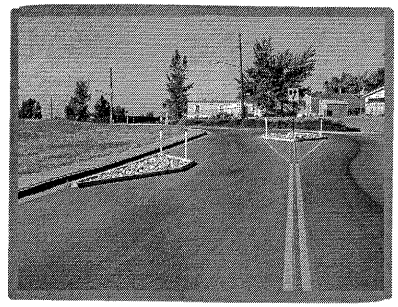
Toolbox of Traffic Calming Measures - Level II, III

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

Approximate Cost: $8,000-14,000

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = I/D
Volume Impacts – Reduction in vehicles per day = I/D
Safety Impacts – Reduction in average annual number of collisions = I/D
Notes: I/D = Insufficient Data

Source: Traffic Calming: State of the Practice, 2000



Advantages
- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by large vehicles (such as fire trucks) except under heavy traffic conditions
- Provides opportunity for landscaping and street furniture

Disadvantages
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be costly, especially if there are drainage issues
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

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Introduction

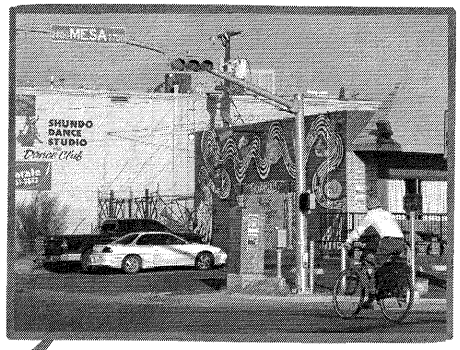
Program Purpose

Create a comprehensive program designed to protect the environment and enhance the quality of life in El Paso neighborhoods through the management and control of traffic on neighborhood streets.

The Neighborhood Traffic Management Program (NTMP) focuses on neighborhood traffic issues, such as cut-through traffic and speeding vehicles on local streets. The information and tools presented in this document will be applicable on most local and collector-level roadways in an effort to reduce traffic speeds and volume while serving multiple uses. Local roadways are defined as streets that provide direct access into residential neighborhoods to connect individual homes to collector and arterial streets. The NTMP outlines a variety of traffic calming measures to improve the quality of life in local residential neighborhoods. The program provides opportunities for residents to work closely with City staff to identify traffic issues and concerns and to determine appropriate solutions.

The objectives for the NTMP are to:

- improve unsafe conditions,
- provide protection and relief from disproportionate increases in traffic,
- provide a program format that is responsive to all neighborhoods, and
- incorporate community preferences into design and operation of neighborhood streets.



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Toolbox of Traffic Calming Measures - Level III

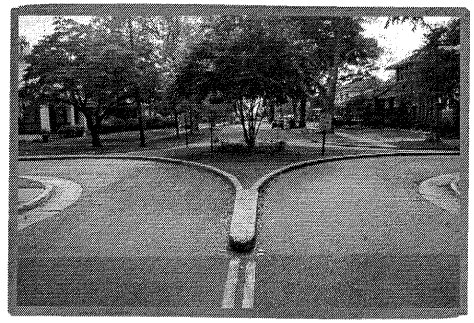
Diagonal Diverter

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.

Approximate Cost: $15,000-35,000

Measured Impacts
Speed Impacts – Reduction in 85th percentile speeds between slow points = -4%

Source: Traffic Calming: State of the Practice, 2000



Advantages
- Does not require a closure per se, only a redirection of existing streets
- Able to maintain full pedestrian and bicycle access
- Reduces traffic volumes

Disadvantages
- Causes circuitous routes for local residents and emergency services
- May be expensive
- May require reconstruction of corner curbs

Acknowledgements

City of El Paso

Mayor
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City Council
Ann Morgan Lilly, District 1
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Melina Castro, District 4
Rachel Quintana, District 5
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Steve Ortega, District 7
Beto O'Rourke, District 8

City Management
Joyce Wilson
Pat Adauto

Traffic Division of Engineering Department
Alan Shubert
Ted Marquez
Kimberly Forsyth
Rudy Pino
Keith Bennett
Julie Baldwin-Muñoz

Toolbox of Traffic Calming Measures - Level III

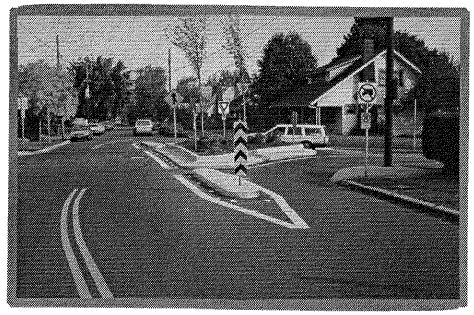
Forced-Turn Island

Forced-turn islands are raised islands that block certain movements on approaches to an intersection.

Approximate Cost: $3,000-5,000

Measured Impacts
Volume Impacts – Reduction in vehicles per day = -31%

Source: Traffic Calming: State of the Practice, 2000



Advantages
- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- Reduces traffic volumes

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

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