

City of Roxboro

Traffic Calming Policy for Neighborhood Streets

The City of Roxboro wishes to have a procedure whereby its' residents can petition the City to incorporate traffic calming devices and systems in order to alleviate speeding, excessive traffic volume, dangerous intersections or other conditions that are of a public safety nature.

The purpose of this document is to present ways in which residents can find solutions to residential traffic problems as approved by the Roxboro City Council. Consideration is given to a variety of residential traffic concerns and to the characteristics of these concerns on a case-by-case basis. Each situation is reviewed with respect to the available traffic control measures that have been, or could be, found effective in alleviating the neighborhood traffic concern.

The following outlines these guidelines and procedures which can be used to develop the optimum solution or solutions to each particular situation. There are many factors taken into consideration when reviewing residential traffic concerns to determine the most feasible traffic control measure. These factors include the surrounding roadway network, resident access, speeds and/or volume of traffic, accident history, neighborhood response and budget considerations.

Note: Public health and safety concerns are always the overriding consideration when installing or removing traffic control devices.

Objectives

The objectives of the City of Roxboro's Traffic Calming Policy for Neighborhood Streets are to improve safety and quality of life for residents by:

1. Achieving appropriate vehicle speeds on residential streets.
2. Involving citizens in the planning and decision making process.
3. Providing a variety of standard measures that can be used to address the unique characteristics of individual neighborhoods.

Policies

1. Traffic calming measures are intended to be applied to City owned local streets serving predominantly single-family residential neighborhoods.
2. Emergency vehicle (police, fire, EMS, rescue, etc.) and public service (solid waste collection, school bus, public transit, etc.) access within and through the proposed project neighborhood will be given priority during the evaluation for

- traffic calming measures. Reasonable access will be maintained and emergency responders and public service providers will be included in the review process. Notification of all traffic calming measures will be made to such providers prior to installation.
3. A variety of standard traffic calming measures (see Attachment #4) will be used to select appropriate measures for each individual project. It is recognized that each project is unique in its needs and requirements and will be studied individually to determine the most appropriate measure(s) for the location.
 4. Requests for neighborhood traffic calming projects will be initiated by citizens living in the proposed project area. Citizen participation from initial request, to project design, to final installation and evaluation is an essential part of successful traffic calming programs. Experience in other municipalities has shown that measures implemented without neighborhood participation are often unsuccessful and frequently result in the removal of the measures after a short period of time.
 5. Neighborhood groups may be required to participate financially in the initial installation costs of traffic calming measures.
 6. The City of Roxboro does not install “STOP” or “Children At Play” signs as speed control measures. See explanation in Attachment #3.

Process

The following process is designed to provide for receipt, evaluation, initiation and follow up of traffic calming requests from local residents. The steps outlined below are to be used as a guideline and may be deviated from if deemed appropriate by the City Manager and/or City Council.

Step 1 – Request for Initial Review

Residents concerned with speeding in their neighborhood should first direct their concerns to the Roxboro City Manager. The City Manager will receive and review their concerns. If the City Manager deems the request appropriate, he or she will forward the matter to the Roxboro Police Department (RPD). The RPD will investigate the concerns and take initial actions to address them. Appropriate initial actions will be determined by the Chief of Police and may include any or all of the following: review of citation and accident history; increased enforcement of posted speed limits; increased enforcement of parking violations; placement of a speed monitoring radar trailer; neighborhood education initiatives through community oriented policing. Based on historical studies, it has been determined that violations of traffic ordinances, such as speed limits, are typically committed by residents of the neighborhood. Therefore, neighborhood education initiatives and targeted local enforcement will be the first step. After evaluation of the concerns and the initial actions to address them, the RPD will report their findings back to City Manager who will forward the report to the City Council.

Step 2 – Request for Analysis

If based on the RPD’s report the residents do not feel that the initial measures are sufficient to effectively address the traffic problem, the resident may request further analysis of the problem by submitting a “Request for Traffic Calming Analysis Petition” (Attachment #1) to the Roxboro City Council. To ensure that there is adequate support for traffic calming within the neighborhood, the resident initiating the process will be asked to get signatures of at least 50% or 10 other residents in the affected area, whichever is less, supporting the request. The “affected area” is defined as those properties along streets expected to receive traffic calming measures, those streets whose access is substantially dependent upon the streets to be calmed, and any streets expected to receive significant increases in traffic volume as a result of the traffic calming installation. The City will be responsible for determining the affected area. Upon receipt and verification of the petition, City Council may direct the Public Services Department, along with the RPD will collect a minimum data set to initially review the request. Although there are no absolute minimum criteria established for traffic calming measures, the following guidelines will be used to evaluate the area:

Daily traffic volume greater than 400 vehicles or peak-hour (7:00 – 9:00am and 3:00 to 6:00pm)volumes greater than 100 vehicles are typically required to consider traffic calming measures.

Traffic calming measures should not be installed on streets less than 1,000 feet long.

Traffic calming measures should not be installed on streets with grades greater than 8%.

Traffic calming measures should not be installed on streets where the vertical or horizontal roadway alignment would result in inadequate stopping sight distance for motorists encountering traffic calming measures.

The following data will typically be collected:

- Vehicular volume (daily and peak hour)
- Speed data (85th percentile, median and average)
- Crash history
- Street characteristics (length, grade, alignment, etc.)
- Emergency and public transit routes
- Pedestrian activity

Step 3 – Prioritization

All traffic calming projects will be ranked based on the criteria listed below. This ranking will allow the City to prioritize projects based on budget availability and compatibility with other transportation projects.

CRITERIA	BASIS FOR POINT ASSIGNMENT	POINTS
Speed	0 to 50 points 5 points for every 1 mph of the 85 th percentile speed that exceeds the posted limit (example: posted speed = 35mph; 85 th percentile speed = 38mph; 38-35=3; 3X5=15 points)	
Pedestrian Activity	0 to 20 points 5 points for each school, church, shopping center etc that is likely to generate a significant number of pedestrians crossing the street	
Crash History	0 to 15 points 3 points for each reported crash occurring within the project areas during the last 3 years	
Volume	0 to 10 points 1 point for each 100 vehicles per day	
Sidewalks	0 or 5 points 5 points if there is not a continuous sidewalk on at least one side of the street	
Total points	100 points available	

Step 4 – Neighborhood Stakeholder Meeting

The Public Services Department along with RDP will conduct a neighborhood stakeholder meeting for residents in the affected area. The meeting will be designed to be highly interactive and will encourage participants to express their opinions and to understand the opinions of others. The purpose of the meeting will be to:

- Educate residents about traffic calming, available traffic calming measures and the process;
- Review the traffic data collected and discuss the specific issues relating to their neighborhood;
- Use the variety of traffic calming measures to discuss which measures that residents feel would be most appropriate for their situation;
- Develop a rough draft traffic calming plan that addresses the issues, is economically feasible and is supported by the residents.

Step 5 – Conceptual Plan Development

The City will create a conceptual plan for the affected area based on the recommendations and proposed solutions from the residents. The conceptual plan

will be reviewed by emergency and public service providers, as well as other City departments as needed. A final report consisting of the conceptual plan and any comments from these reviews will be produced.

Step 6 – Report to Neighborhood

The Roxboro City Council will conduct a public meeting with the affected area to review the conceptual plan and comments. Approximate project costs and installation schedule will also be presented. The City may require financial participation by residents in the affected area for initial installation of the measures. Participants will be asked to provide comments and help refine the recommended design. The City will refine the design as needed to address comments received at this meeting.

Step 7 – Final Approval

A final public meeting will be held with the affected area to present the final traffic calming plan. A final budget and schedule for implementation will be presented at this time. Residents in the affected area will be given a ballot (Attachment #2) to cast their vote for approval or disapproval of the final project. Approval of the plan will require that 60% of the residents in the affected area vote “yes” for the plan. Only one vote will be allowed per property with the exception of multiple family dwellings wherein each dwelling unit shall be allowed one vote. The City will use tax records and water billing information for distributing and insuring that all residents in the affected area receive a ballot. After reasonable efforts have been made, non-responsive residents will be considered as “no” votes. Upon verification of the submitted ballots and approval of the plan, the City Council will consider final approval and implementation of the project.

Step 8 – Removal of Measures

In order to give the installed measures adequate time to cause a change in driver behavior, the measures will not be removed for two (2) years. After the measures have been in place for two (2) years, residents in the area may petition the City to remove or significantly modify the measures. The petition process will require 60% of the residents in the originally defined “affected area” to approve the requested action. Upon receipt of a valid petition and with approval of the City Council, traffic data will be collected and analyzed to determine any change in speed or volume in the project area from the original collected data. A report on all collected data will be provided to the petitioners. If initial objectives of the project have not been achieved, the City and residents may then consider alternative solutions or removal. Prior to final action, the City will hold a public meeting to receive comments. Petitioners may be required to pay for removal costs and any additionally installed measures. *(The City reserves the right to*

remove any or all measures within the project area before the end of two (2) years if it is deemed necessary due to public health or safety reasons.)

Funding

The City of Roxboro has not identified any special funding source for traffic calming projects. Nor has the City set-aside any existing funds to be used exclusively on traffic calming projects. Funding options available are special assessments, operating funds, and private funding. The City of Roxboro City Council will determine the appropriate funding mechanism for the installation of traffic calming devices on a case by case basis.

Assessments:

Installation of traffic calming devices is considered a street improvement and are eligible for special assessments in accordance with North Carolina General Statute § 160A-216 (1).

Powell Bill / General Fund (Operating Budget):

The City of Roxboro will cover the cost of activities associated with the development, construction and installation of traffic calming devices dependent upon the availability of funding.

Private Funding:

Residents of an existing neighborhood wishing to accelerate the process may choose to fund all or part of the development, construction and installation of their requested traffic calming device.

Powell Bill / General Fund (Operating Budget)/Private Funding:

The City of Roxboro and residents of an existing neighborhood will share in the cost of activities associated with the development, construction and installation of traffic calming devices. The City's participation in any cost sharing venture is dependent on the availability of funding.

Attachment #1

City of Roxboro
Request for Traffic Calming Analysis Petition

We, the residents of _____, request
the City of Roxboro to review the possible installation of traffic calming
measures in our neighborhood, in accordance with the City of Roxboro's policy,
because of the following concern(s):

Signature	Print Name	Address	Date
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50% of the residents or Ten (10) individual resident's signatures and information are required (which ever is less).

Name of Resident Requesting Review

Address

Day Time Phone Number

Home Phone Number

Attachment #2

**City of Roxboro
Traffic Calming Voting Ballot**

Date:

Location of Traffic Calming Plan:

Please use this form to cast your vote for the proposed traffic calming plan and return it to City Hall by _____ (Date).

I have reviewed the final traffic calming plan and I am in favor of the traffic calming plan that has been proposed. (Please circle your choice)

YES

NO

My address is: _____

Signature: _____

Printed Name: _____

Please return this ballot to City Hall by (date) _____ . Thank you for your assistance.



Why Stop Signs Are Not Used For Speed Control

One of the most common requests a City may receive is for the installation of stop signs to slow speeders in neighborhoods.

It seems like an obvious, inexpensive way to reduce vehicle speeds. However, what seems to be a perfect solution actually causes other problems.

When stop signs are used as "nuisances" or "speed breakers," there is a high incidence of drivers intentionally ignoring the sign. When vehicles do stop, the speed reduction is effective only in the immediate area of the sign, since a large percentage of motorists then increase their speed to make up for lost time. This results in increased mid-block speeding. Most drivers are reasonable and prudent. However, when confronted with unreasonable and unnecessary restrictions, motorists are more likely to violate them, and they develop contempt for all traffic signs...often with tragic results.

For these reasons, the City of Roxboro does not use stop signs as speed control devices. Instead, they are used to improve safety at intersections where traffic volumes or accidents require them.



"Children at Play" Signs

Another frequent request Roxboro receives is for "Children at Play" signs. Some parents believe that the safety of their children playing in or near the street can be enhanced through the installation of "Slow Children" or "Children at Play" signs.

Traffic studies have shown that such signs do not cause drivers to pedestrian accidents. In fact, placement of these signs can increase the potential for accidents by giving children and parents a false sense of security. Children should not be encouraged to play in the street. A sign cannot replace a parent's responsibility to monitor their children. Federal standards, such as the FHWA Manual of Uniform Traffic Control Devices, reject these signs because they openly suggest that playing in the street is acceptable.

For these reasons, the City of Roxboro does not install these types of signs, and instead encourages parents and/or guardians to find alternative play areas for children, such as a backyard or local park.

City of Roxboro Traffic Calming Policy for Neighborhood Streets

Traffic Calming Measures

Traffic calming measures are generally categorized into four groups: Nonphysical, Vertical, Horizontal, and Diversion.

Non-physical Measures

Non-physical methods of traffic calming generally do not alter the physical path of traffic. They typically do not require significant construction or alteration of the roadway. These measures normally require lower cost materials such as line striping or signing. Some non-physical measures however, can be costly. These non-physical measures should be considered and implemented before using more complicated and costly traffic calming measures. The non-physical measures included in this “toolbox” are as follows:

1. Speed Enforcement
2. Radar Trailers
3. Lane Striping
4. Pavement Marking Legends
5. Signage
6. High Visibility Crosswalks
7. On-Street Parking
8. Raised Pavement Markers
9. Streetscaping
10. Turning and Other Restrictions
11. Gateways / Entranceways

1. Speed Enforcement – targeted speed limit enforcement in selected areas on a temporary basis.



Advantages

- May be implemented immediately with little planning
- No impact to emergency response times
- Effective for reducing speeds in a short span
- Secondary benefits include reduced crime and a higher sense of security

Disadvantages

- Expensive to maintain for an extended period of time
- May only be effective for a short time
- May only be effective for short distances

Cost: Varies

2. Radar Trailers – placement of a radar trailer to measure and display a passing vehicles speed compared to the posted speed limit reminds drivers to slow down if they are traveling too fast.



Advantages

- In the long-term, less expensive than police enforcement
- May be implemented immediately with little planning
- No impact to emergency response times
- Effective for reducing speeds in a short span

Disadvantages

- Only effective for one direction of travel at a time
- May only be effective for a short time
- May only be effective for short distances

Cost: Varies

3. Lane Striping – used to visually narrow travel lanes in a given area. Using highly visible stripes, drivers are encouraged to slow down.



Advantages

- Inexpensive
- May be implemented immediately with little planning
- No impact to emergency response times

Disadvantages

- Increases maintenance costs

Cost: \$0.25 - \$1.00 per linear foot (paint)
\$1.00 - \$5.00 per linear foot (plastic)

4. Pavement Marking Legends – speed limit or other driver information is painted on the street to remind drivers of the speed limit or other special conditions of the area.



Advantages

- Inexpensive
- May be implemented immediately with little planning
- No impact to emergency response times

Disadvantages

- Increases maintenance costs
- Has not been proven to reduce speeds

**Cost: \$25 - \$50 per letter or number
\$100 - \$200 per symbol**

5. Signage – placing additional regulatory signs and appropriate warning and information signs to remind drivers of the various roadway conditions and hazards in the area.



Advantages

- Inexpensive
- No impact to emergency response times

Disadvantages

- Increases maintenance costs
- Signs are typically considered unsightly and some people do not want them in their yard

Cost: \$75 - \$100 per sign

6. High Visibility Crosswalks – high intensity paint or plastic can be used to clearly delineate a crosswalk. Should be accompanied by signage.



Advantages

- Inexpensive
- No impact to emergency response times
- Helps collect and distribute pedestrians at one point along the street
- Increases visibility of pedestrians

Disadvantages

- Increases maintenance costs over that of a normal crosswalk
- May provide pedestrians with a false sense of security, especially if used at mid-block locations

Cost: \$200 - \$300 per crosswalk lane

7. On-Street Parking – designates an area along a street to park vehicles. May be used on one side or both sides of the street depending on the width of the street.



Advantages

- Provides more vehicle storage
- Narrows street width to encourage slower vehicle traffic
- Shortens pedestrian crossing distance
- Encourages pedestrian activity in the area

Disadvantages

- May be ineffective if parking is not adequately utilized
- May reduce sight distance for both drivers and pedestrians
- May increase certain types of vehicular crashes
- May restrict bicycle movement
- Traffic volumes may increase in areas with high demand and low availability of off street parking
- May impede emergency response vehicles and solid waste collection

Cost: Depends on frequency of spaces

8. Raised Pavement Markers – plastic reflectors installed in the pavement that alert a driver when they are deviating from the travel lane. They can be installed on the centerline and edgeline of a roadway or across a road to serve as a rumble strip. They are often used on curves.



Advantages

- Inexpensive
- May be implemented immediately with little planning
- No impact to emergency response times
- Secondary benefits include increased delineation and roadway safety

Disadvantages

- Noise
- May be unintentionally removed during snow removal
- Increased maintenance costs

Cost: \$2.00 - \$7.00 per marker

- 9. Streetscaping – typically includes planting trees and other landscape along the roadway. Also usually involves establishing a planting area between the street and the sidewalk.**



Advantages

- May reduce speeds and volumes
- Positive aesthetic effect
- Increases pedestrian safety
- Improves quality of life for neighborhood
- No impact to emergency response times

Disadvantages

- Can create vehicular hazards
- Can create poor visibility conditions if installed too dense
- High cost
- Increased maintenance costs

Cost: Varies depending on materials, length and width of application area, and availability of right-of-way

10. Turning and Other Restrictions – turn restriction signs can be posted to restrict movement through a given area and to limit travel in certain areas. Other restrictions such as “No Trucks” can also help reduce cut-through traffic. Speed limit reductions can be used in areas where existing speed limits are deemed too high; however, speed limit changes alone are generally not effective in significantly reducing vehicular speeds on local streets.



Advantages

- Inexpensive to install
- No impact to emergency response times
- May increase pedestrian safety
- Transit and school buses can be exempted
- Restrictions can be “time limited”

Disadvantages

- Deliberate violation could create hazard
- May divert problem to another street
- Requires enforcement
- Requires approval of an enabling ordinance
- Not effective at reducing speeds

Cost: \$75 - \$100 per sign plus the cost of enforcement

11. Gateways / Entranceways – include decorative signing and/or landscaping to visually identify the entrance to a neighborhood. This helps make the area appear more as a destination rather than a connection to another area. A median island is often incorporated into the design.



Advantages

- May reduce volumes
- Positive aesthetic effect
- Improves quality of life for neighborhood
- No impact to emergency response times

Disadvantages

- Can create vehicular hazards
- Can create poor visibility conditions
- Can be expensive
- Increased maintenance costs
- May require additional right of way

Cost: Varies depending on materials, length and width of application area

Vertical Measures

Vertical traffic calming measures introduce variations in pavement height or travel surfaces that cause discomfort to the occupants of vehicles operating in excess of the desired speed limit. These measures do not restrict traffic flow so they are typically not used to mitigate cut-through traffic concerns. However, because of the inconvenience they cause, some non-local traffic may avoid areas when they are installed.

Vertical traffic calming measures are usually considered undesirable for primary emergency response routes and transit routes.

The vertical measures included in this “toolbox” are as follows:

1. Textured Pavements
2. Speed Humps
3. Speed Lumps
4. Speed Tables
5. Raised Crosswalks
6. Raised Intersections

1. Textured Pavement – textured pavement can alert drivers to special conditions through sound and/or vibration. Brick pavers are a form of textured pavement.



Advantages

- May reduce speeds
- May add aesthetic value
- If used at intersection, can calm two streets at once
- Little or no impact to emergency response times

Disadvantages

- Textured materials are expensive
- Increased noise
- Difficult for physically challenged individuals to maneuver
- Increased maintenance costs

Cost: Varies depending on materials and application area

2. Speed Humps – raised hump in the roadway with a parabolic top which extends across the road at right angles to the direction of traffic flow. Most effective if used in a series, spaced 300-500 feet apart.



Advantages

- Effective in reducing speeds
- Compatible with pedestrian and bicycle movements
- May decrease cut-through traffic by increasing travel time
- Inexpensive

Disadvantages

- Increased noise when vehicle travel over them
- Slows emergency vehicles
- Aesthetics
- Can be very uncomfortable to vehicle occupants with certain disabilities
- Increased maintenance costs

Cost: \$1,500 - \$2,000 each

3. Speed Lumps – variations of speed humps that add two cut-outs for tires of larger vehicles. The cut-outs are designed so that wider vehicles, such as emergency vehicles, can fit thorough with little slowing but a standard vehicle must pass at least one side of its wheels over the hump.



Advantages

- Effective in reducing speeds
- Maintains rapid emergency response times
- Relatively easy for bicyclists to cross if installed correctly
- Inexpensive

Disadvantages

- Increased noise when vehicle travel over them
- Some private vehicle with large wheel bases can avoid the humps
- Aesthetics
- Can be very uncomfortable to vehicle occupants with certain disabilities
- Increased maintenance costs

Cost: \$1,800 - \$2,500 each

4. Speed Tables – elongated speed humps with flat tops that usually allow for the entire wheel base of a standard vehicle to be on the top flat part. Usually, a textured pavement or alternative design is used to distinguish the speed table from the rest of the roadway.



Advantages

- Smother than humps for larger vehicles
- Effective in reducing speeds
- Compatible with pedestrian and bicycle movements
- May also decrease cut-through traffic by increasing travel time

Disadvantages

- Increased noise when vehicle travel over them
- Decorative materials are expensive
- Aesthetics, if decorative surface is not used
- Can be very uncomfortable to vehicle occupants with certain disabilities
- Increased maintenance costs
- Slows emergency vehicles

Cost: \$1,500 - \$4,000 each

4. Raised Crosswalks – equivalent to speed tables with crosswalk markings. Should include signage.



Advantages

- Smother than humps for larger vehicles
- Effective in reducing speeds
- Increases visibility for pedestrians
- May also decrease cut-through traffic by increasing travel time
- Slows vehicular traffic at conflict point with pedestrians
- Better than a simple crosswalk for visually impaired pedestrians

Disadvantages

- Increased noise when vehicle travel over them
- Decorative materials are expensive
- Aesthetics, if decorative surface is not used
- Can be very uncomfortable to vehicle occupants with certain disabilities
- Increased maintenance costs
- Slows emergency vehicles

Cost: \$1,8 00 - \$4,500 each

5. Raised Intersections – equivalent to speed tables, only they are applied over the entire intersection with ramps on all sides. They are normally at or near the same elevation as the sidewalk. They often use textured and/or colored pavements.



Advantages

- Smoother than humps for larger vehicles
- Effective in reducing speeds
- Increases visibility for pedestrians
- May also decrease cut-through traffic by increasing travel time
- Slows vehicular traffic at conflict point with pedestrians

Disadvantages

- Increased noise when vehicle travel over them
- Decorative materials are expensive
- Aesthetics, if decorative surface is not used
- Can be very uncomfortable to vehicle occupants with certain disabilities
- Increased maintenance costs
- Slows emergency vehicles

Cost: Varies based on materials and size of intersection

Horizontal Measures

Horizontal measures are used to eliminate straight-line travel that allows high speeds. The horizontal measures included in this “toolbox” are as follows:

1. Curb Extensions
2. Chicanes
3. Two-Lane Chokers
4. Medians
5. Lane Shifting with Alternating Parking

1. Curb Extensions – make pedestrian crossing movements shorter and easier. Used to narrow the roadway cross-section at particular points but still maintains separate lanes for opposing traffic flow. Often used in combination with a raised crosswalk.



Advantages

- Narrows street width to encourage slower vehicular traffic at specific points
- Shortens pedestrian crossing distance and make pedestrians more visible
- May facilitate more on-street parking spaces
- Intended to reduce vehicle speeds

Disadvantages

- Conflicts with flow of bicycle lanes
- Requires removal of some on-street parking

Cost: \$7,000 - \$10,000 per pair

2. Chicanes – physical restriction built at the curbside of the roadway to create bends in a formerly straight road. Vehicles are forced to negotiate the narrowed road in a serpentine fashion.



Advantages

- Typically results in lower speeds
- Can be aesthetically pleasing
- May also decrease cut-through traffic by increasing travel time

Disadvantages

- May lead to head-on collisions
- Higher maintenance costs
- Can severely impact emergency response time
- Loss of on street parking

Cost: \$4,000 - \$8,000 (depends on length of road)

3. Two-Lane Chokers – used at mid-block points to reduce the overall cross section of the street providing a natural slow down point.



Advantages

- May reduce speeds
- May reduce volumes
- Positive aesthetic effect
- Provides safer pedestrian crossings
- May encourage on-street parking
- No impact to emergency response times

Disadvantages

- No vertical or horizontal deflection
- Loss on on-street parking
- Bicyclists have to merge with traffic

Cost: \$7,000 - \$10,000

4. Medians – used to separate lane movements and provide a visual cue along the roadway. Medians can also be used as a diversion device by restricting access at intersection and to adjacent properties.



Advantages

- Prevents passing movements along roadway
- Provides area for landscaping
- Effective in reducing speeds
- Provides pedestrian refuge area and aids crossing
- Can be used to restrict movements at intersections

Disadvantages

- May require parking removal
- Can be costly
- May limit access depending on length of median section
- May reduce sight distance depending on roadway alignment and size of median
- May impact emergency response times

Cost: Varies based on size and materials

5. Lane Shifting with Alternating Parking – shifting traffic lanes within the existing roadway by use of lane markings and parking. The zigzag pattern allows for two full lanes while permitting short stretches of parking on alternating sides of the street.



Advantages

- Provides more vehicle storage
- Narrows street width to encourage slower vehicle traffic
- Shortens pedestrian crossing distance
- Encourages pedestrian activity in the area

Disadvantages

- May be ineffective if parking is not adequately utilized
- May reduce sight distance for both drivers and pedestrians
- May increase certain types of vehicular crashes
- May restrict bicycle movement
- Traffic volumes may increase in areas with high demand and low availability of off-street parking
- May impede emergency response vehicles and solid waste collection

Cost: Depends on frequency

Diversion Measures

Diversion measures change the flow of traffic and limit or eliminate certain movements. Diversion measures should only be used as a final option when the previously described measures have not produced the desired results. Diversion measures are not considered on primary emergency routes unless provisions can be made to maintain access for emergency vehicles. The diversion measures included in this “toolbox” are as follows:

1. Street Closures
2. Diagonal Diverters
3. Semi-diverters

1. Street Closures – placing barriers or removing pavement to block all traffic access on a street. Pedestrian and bicycle access is typically maintained. Can be designed to allow emergency vehicles to “breakthrough” the closure. Cul-de-sacs are a common form of this measure.



Advantages

- Eliminates through traffic
- Reduces speeds
- Improves safety for all modes of transportation

Disadvantages

- Limits access
- Creates problems for emergency vehicles
- Need to construct turn-around area near the closure point

Cost: Depends on size and materials

2. Diagonal Diverters – bisect an intersection diagonally, disconnecting the legs of the intersection and creating two separate roadways. Can be accomplished with a simple barrier such as guardrail or can be created by removing pavement and adding landscaping. Pedestrian and bicycle access is usually maintained. Can be designed with emergency vehicle “break-through” ability.



Advantages

- Reduces speeds and volumes
- Can be an aesthetic enhancement
- Increases pedestrian safety
- Improves neighborhood quality of life

Disadvantages

- Can create vehicular hazards
- May create poor visibility conditions
- Can be expensive
- Creates problems for emergency vehicles

Cost: Depends on size and materials

3. Semi-diverter – typically a landscaped island barrier located on one side of the street at an intersection that only permits traffic on the opposite side to pass through. This creates a one-way street at the intersection but maintains two-way traffic for the rest of the block.



Advantages

- Reduces volumes
- Can be an aesthetic enhancement
- Increases pedestrian safety
- Improves neighborhood quality of life
- Limits cut-through traffic

Disadvantages

- Can create vehicular hazards
- Permanently restricts traffic
- Can create poor visibility conditions
- Can be expensive
- Does not control speed
- May impede emergency response times

Cost: Depends on size and materials