

Appendix A. Traffic Calming Policy Manual for Local Streets and Subdivisions

Introduction

This *Traffic Calming Policy Manual for Local Streets and Subdivisions* was created as a companion to the Forsyth County Comprehensive Transportation Plan of 2017. This manual is designed to inform both county officials and community members when considering traffic calming measures along existing 2-lane local, residential, and/or subdivision street. The traffic calming treatments listed in this appendix have been vetted through a value analysis and are considered appropriate for local and subdivision streets in Forsyth County.

New streets should follow Forsyth County Engineering standards, consider the needs of people driving, biking and walking, and consider traffic calming elements as part of installation. Measures outlined within are offered for consideration when retrofitting existing streets and fall into three broad categories:

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| <ol style="list-style-type: none"> 1. STREETSIDE MODIFICATIONS <ol style="list-style-type: none"> 1A. Vehicle Activated Signs 1B. Curb and Landscaping 1C. Street Lights/Vertical Elements
 3. LANE AND DIRECTIONAL CHANGES <ol style="list-style-type: none"> 3A. Curb Extensions 3B. On-Street Parking 3C. Chicanes 3D. Road Diet | <ol style="list-style-type: none"> 2. PHYSICAL BARRIERS <ol style="list-style-type: none"> 2A. Speed Humps/Speed Tables 2B. Diverters 2C. Center Medians/Traffic Islands 2D. Roundabouts/Traffic Circles |
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Recognizing that not every traffic calming modification works in every situation, this manual includes a summary and thresholds matrix to help community members and county officials determine which measures are most appropriate for targeted street segments. The value analysis evaluates six conditions and answers key questions:

Overall Effectiveness

- How effective is the measure at calming traffic/slowing speeds?

Pedestrian Benefit

- Can the measure increase pedestrian safety and comfort?

Multiple Locations

- How location specific is this measure and can it be used along any street?

Impact to Vehicles

- Does the measure have adverse effects on vehicles?

Cost to Install

- Does the measure have a higher upfront cost than other measures?

Thresholds and Guidelines

Minimum Requirements

In order for installation of traffic calming measures to be considered, the following criteria must be met:

1. Only streets classified as Local or Residential (also known as local roads or subdivision streets) with posted speeds of 35 mph or less should be eligible for Traffic Calming Measures outlined within.
2. Traffic Calming Measures should not divert traffic to nearby local roads and/or subdivision streets.
3. Emergency vehicle access must be preserved and consideration given to school bus, sanitation vehicle, and future transit access.
4. Pedestrian and bicycle access must be preserved, considered, and/or accommodated when possible.

Forsyth County will not paint centerline or other street striping for local and subdivision roads. The effect of this type of road marking will often increase speeds to levels not appropriate for local and subdivision roads.

Table 30: Traffic Calming Treatment Thresholds

1. STREETSIDE MODIFICATIONS		
1A. Vehicle Activated Signs	Type of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	Appropriate for all speed limits, no limitation
	Design Vehicles:	Appropriate for all vehicles, no limitation
	Street Grades:	Appropriate for all street grades, no limitation
	Existing Policy:	Forsyth County Speed Zone Ordinance, 2015
1B. Curb and Landscaping	Types of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	Appropriate for all speed limits, no limitation
	Design Vehicles:	Appropriate for all vehicles, no limitation
	Street Grades:	Appropriate for all street grades, no limitation
	Existing Policy:	Ordinance 101
1C. Street Lights/Vertical Elements	Types of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	Appropriate for all speed limits, no limitation
	Design Vehicles:	Appropriate for all vehicles, no limitation
	Street Grades:	Appropriate for all street grades, no limitation
	Existing Policy:	Ordinance 101
2. PHYSICAL BARRIERS		
2A. Speed Humps/Speed Tables	Types of Streets:	Appropriate for local roads/subdivision streets with traffic volumes less than 3,000 vehicles per day
	Speed Limits:	30 mph or less
	Design Vehicles:	Appropriate for all vehicles avoid placement along emergency vehicle routes
	Street Grades:	Speed Humps: Not recommended on streets in excess of 8% Speed Tables: Not recommended on streets in excess of 6%
	Existing Policy:	Forsyth County Speed Hump Policy, 1996

2B. Diverters	Types of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	30 mph or less
	Design Vehicles:	Same design vehicles used in the original street design, provided full lane width throughout the diversion
	Street Grades:	Not recommended on streets in excess of 6%
2C. Center Medians/Traffic Islands	Existing Policy:	No existing adopted County policy
	Types of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	35 mph or less
	Design Vehicles:	Same design vehicles used in the original street design appropriate for emergency vehicle routes
2D. Roundabouts/Traffic Circles	Street Grades:	Not recommended on streets in excess of 8%
	Existing Policy:	No existing adopted County policy
	Types of Streets:	Appropriate for all local roads/subdivision streets
	Speed Limits:	40 mph or less
2D. Roundabouts/Traffic Circles	Design Vehicles:	Predominately passenger vehicles
	Street Grades:	Not recommended on streets in excess of 6%
	Existing Policy:	No existing adopted County policy
	3. Lane/Directional Changes	
3A. Curb Extensions	Types of Streets:	Appropriate for local roads/subdivision streets, including two-lane, two way streets or one lane, one-way streets
	Speed Limits:	35 mph or less
	Design Vehicles:	Primarily the same design vehicles used in the original street design
	Street Grades:	Not recommended on streets in excess of 6%
3B. On-Street Parking	Existing Policy:	No existing adopted County policy
	Types of Streets:	Appropriate for local roads/subdivision streets Parking lanes should be 7-10 ft wide from face of curb
	Speed Limits:	35 mph or less
	Design Vehicles:	Predominately passenger vehicles rather than trucks
3C. Chicanes	Street Grades:	Not recommended on streets in excess of 6%
	Existing Policy:	No existing adopted County policy
	Types of Streets:	Appropriate for local roads/subdivision streets/ Streets may be, two-way or one-way streets
	Speed Limits:	25 mph or less
3D. Road Diet	Design Vehicles:	Same design vehicles used in the original street design, provided full lane width throughout the chicane
	Street Grades:	Effective in both level and steep topography
	Existing Policy:	No existing adopted County policy
	Types of Streets:	Appropriate for local roads/subdivision streets
3D. Road Diet	Speed Limits:	Appropriate for all speed limits, no limitation
	Design Vehicles:	Same design vehicles used in original street design
	Street Grades:	Appropriate for all street grades, no limitation
	Existing Policy:	No existing adopted County policy

Streetside Modifications

Vehicle-Activated Signs

DESCRIPTION:

Vehicle-Activated Signs react dynamically to the speed of individual vehicles traveling along streets. These signs display illuminated messages, typically an approaching vehicle's speed, in real time. These signs are most often paired with a posted speed limit sign.

Vehicle-Activated Signs can be either permanently installed (affixed to a pole) similar to standard traffic signs, temporary installations (often as part of a movable trailer system), or a combination of both.

These signs are most effective when paired with speed enforcement via law enforcement officers, cameras, and license plate readers. Forsyth Sheriff's Office has speed trailers that can be used for temporary setup.

A system of Vehicle-Activated Signs can also record speeds and inform traffic studies and decisions associated with longer term traffic mitigation and calming measures.

Vehicle-Activated Signs can be used along any street but are most effective where speeding is a major concern and funds, conditions, or other circumstances prohibit the use of other traffic calming measures outlined within.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- MOST AFFORDABLE OPTION
- CAN BE TEMPORARY AND/OR PORTABLE
- NO REQUIRED INFRASTRUCTURE OR ROADWAY CHANGES

CONS

- LEAST EFFECTIVE WHEN NOT PAIRED WITH ENFORCEMENT
- DOES NOT STRONGLY BENEFIT PEDESTRIANS

Curb and Landscaping

DESCRIPTION:

Street sections including a hard curb, combined with narrowed travel lanes, and vertical landscaping and ground cover located in proximity to the curb can be used to effectively calm traffic. The addition of a landscaped planting strip between the road edge/curb and sidewalk creates a feeling a safety for pedestrians and helps slow traveling vehicles.

Vertical elements, such as low grasses and bushes within the planting strip, are the most effective landscaping elements to calm speeds.

When appropriately designed, landscaped sections can also help manage stormwater runoff. Rain gardens are effective in proximity to the curb.

LOCATIONS:

Curb and landscaping can be used along any street, but often within a more urban area. Must conform to clear zone offset requirements. Trees should be planted in back section of right-of-way.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- HELPS WITH STORMWATER MANAGEMENT
- SUPPORTS PEDESTRIANS BY CREATING A PROTECTED/BUFFERED STREET EDGE

CONS

- UPFRONT COSTS
- OFTEN USED IN MORE URBAN AREAS

Street Lights/Similar Vertical Elements

DESCRIPTION:

Vertical Elements used to calm traffic are mostly provided in the form of properly located and spaced street lights. Other vertical objects, including transit shelters, public art, and building facades built to the street edge can be utilized to calm vehicle speeds along adjacent street.

Street lights and other vertical elements create a sense of enclosure that can subconsciously slow people driving. When used in a pattern these objects can calm speeds, improve aesthetics, and enhance public safety without major impact on the street itself.

LOCATIONS:

While Streetside Vertical Elements are most often deployed in urban settings, they can be utilized almost anywhere that has need for reduced speeds and traffic calming that cannot be accomplished through modifications to the roadway.

VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



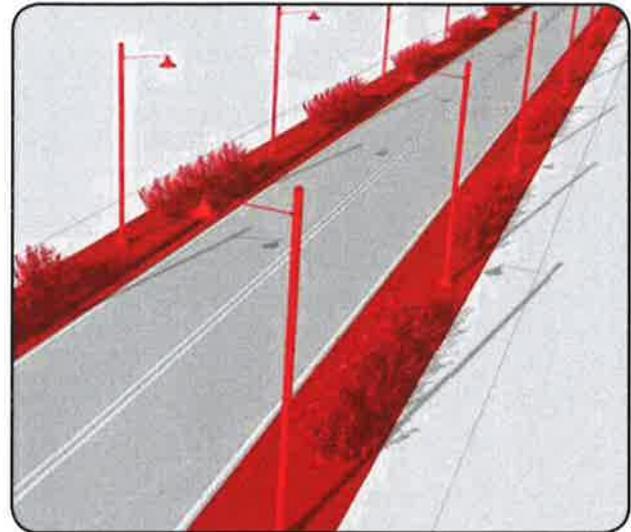
COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- LIGHTING CAN IMPROVE PUBLIC SAFETY
- ADDED VISUAL APPEAL
- PEDESTRIAN ENVIRONMENT/SENSE OF PLACE

CONS

- MULTIPLE FACTORS TO CONSIDER INCLUDE: LOCATION, SPACING, AND LIGHT QUALITY
- LIGHTING CAN IMPACT ADJACENT PROPERTIES
- Possible R.O.W ACQUISITION

Physical Barriers

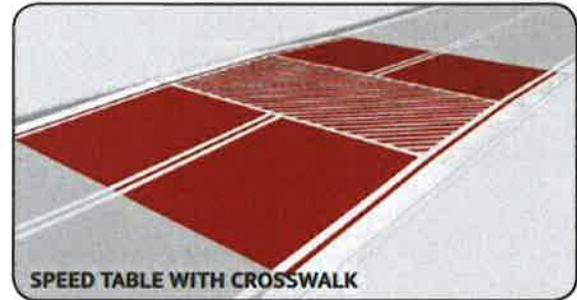
Speed Tables and Raised Crosswalks

DESCRIPTION:

Speed Tables are raised roadway features that compel drivers to slow down when approaching. These devices are most effective when deployed in evenly spaced sets instead of individually.

Speed Tables utilize a flat top with ramps leading up and down to the peak. Speed tables are often paired with pedestrian crossings and/or curb extensions (3A). Speed tables can also include “Raised Intersections” which include the central portion of an intersection and it’s approach ramps. Speed Tables cause less damage to vehicles.

Consideration should be given to the design of Speed Tables to accommodate people driving, walking and biking. This includes both pedestrian crosswalks and vehicular stop bars. Stormwater should be considered prior to installation.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



PEDESTRIAN BENEFIT



MULTIPLE LOCATIONS



IMPACT TO VEHICLES



COST TO INSTALL



MAINTENANCE OVER TIME



- PROS**
- AN EFFECTIVE AND AFFORDABLE OPTION
 - LITTLE INFRASTRUCTURE CHANGE REQUIRED AT INSTALLATION
 - TEMPORARY OR PERMANENT OPTIONS

- CONS**
- CAN CAUSE VEHICULAR DAMAGE
 - SLOWS EMERGENCY VEHICLES
 - CAN IMPEDE BICYCLISTS
 - REQUIRES MAINTENANCE OVER TIME

Diverters

DESCRIPTION:

A diverter is a raised median/island built at or in an intersection. Diverters are most often used to restrict left-hand turning movements at busy intersections.

A traffic calming diverter is usually used along two-lane streets with multi-directional traffic and can be placed either across both lanes of traffic or a single lane depending on the desired result.

The three common traffic calming diverters include:

- Right-Turn Diverters
- Split (or Diagonal) Diverters
- Central Diverters

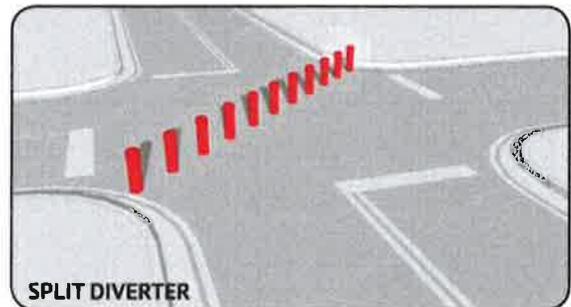
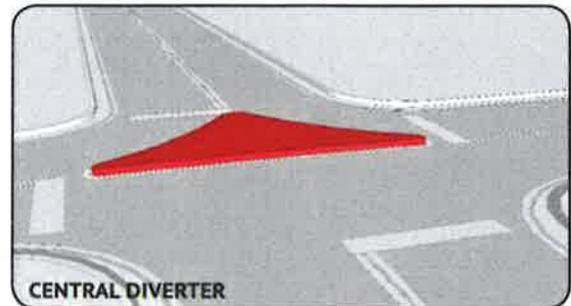
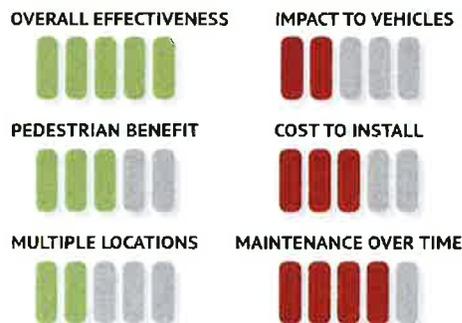
LOCATIONS:

Diverters can be placed in a variety of intersections depending on the desired outcome. Right-Turn Diverters are often utilized at major intersections to create a right turn lane. These diverters are also utilized in some multi-directional applications to prevent crossing traffic or making left-hand turning movements at certain intersections.

Split and Central Diverters are most often used in residential neighborhoods with preexisting intersections as a way to prevent or mitigate cut-through traffic.

Diverters can also be installed in a temporary manner using bollards or planters to determine the long-term feasibility of the measure.

VALUE ANALYSIS:



PROS	<ul style="list-style-type: none"> • WORKS WITHIN EXISTING INFRASTRUCTURE • TRAFFIC GOES IN A CONSISTENT DIRECTION • AFFORDABLE APPLICATION • TEMPORARY OR PERMANENT OPTIONS
	<ul style="list-style-type: none"> • CAN BE LESS INTUITIVE • DISRUPTS STREET NETWORK • DRIVERS CAN IGNORE/NAVIGATE AROUND • CAN APPEAR TO BE AN AFTERTHOUGHT (VISUALLY)

Center Medians/Traffic Islands

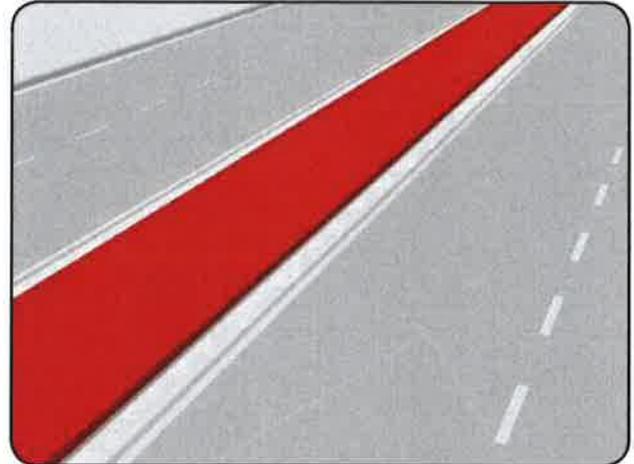
DESCRIPTION:

A median or island is an area that divides traffic traveling in opposite directions along a roadway and restricts the turning movements of cross-traffic. Medians can be either raised or recessed into the grade and most often include a mix of decorative hardscape or landscape elements. Medians can create an area of refuge for people crossing wide roadways and local streets.

Landscaped medians can provide stormwater benefits by slowing down and/or treating stormwater runoff as well as traffic calming by reducing the lane width (3D) and creating visual enclosure when combined with vertical elements (1C).

LOCATIONS:

Center medians and traffic islands are used almost exclusively on multi-directional roadways with higher traffic counts as their cost effectiveness rarely benefit smaller scaled sections.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- CREATES A BETTER ENVIRONMENT FOR PEDESTRIANS CROSSING MULTI-LANE ROADS
- INCREASES LANDSCAPING
- LIMITS CROSS-TRAFFIC TURNING MOVEMENTS

CONS

- EXPENSIVE TO BUILD
- LIMITED APPLICATION
- MAINTENANCE

Roundabouts/Traffic Circles

DESCRIPTION:

Roundabouts are circular intersections used to reduce conflicts and calm traffic and are often placed along highways in lieu of traffic signals or stop signs. Roundabouts minimize the likelihood of collisions by reducing traffic speed and “t-bone” or head-on collisions.

Neighborhood traffic circles are typically much smaller than roundabouts and often replace stop signs at local four-way intersections. They are often installed within residential areas to slow traffic and reduce accidents. Traffic Circles typically limit vehicle size and are designed to prevent access/cut-through traffic by larger vehicles.

Traffic direction and slower speeds make roundabouts and traffic circles safer for pedestrians and bicyclists.

LOCATIONS:

Traffic circles can be used at a variety of intersections, however their use is often limited by their scale and the amount of right of away available.

Traffic calming roundabouts are typically recommended for two lane multi-directional streets as there are other more cost effective measures to use on larger street systems. Roundabouts on large street sections should only be proposed to help with traffic flow efficiency.

VALUE ANALYSIS:

OVERALL EFFECTIVENESS



PEDESTRIAN BENEFIT



MULTIPLE LOCATIONS



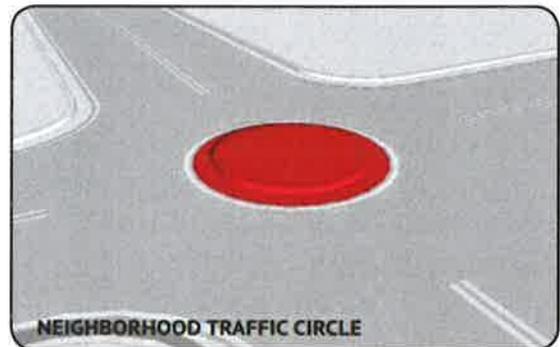
IMPACT TO VEHICLES



COST TO INSTALL



MAINTENANCE OVER TIME



- PROS**
- INCREASES AREA LANDSCAPING
 - MORE EFFICIENT VEHICLE MOVEMENT
 - OFTEN REDUCES VEHICULAR ACCIDENTS
 - CAN CREATE A GATEWAY OR SENSE OF PLACE

- CONS**
- EXPENSIVE
 - CAN BE LESS INTUITIVE TO NAVIGATE
 - REQUIRES RIGHT OF WAY ACQUISITION

Lane and Directional Changes

Curb Extensions

DESCRIPTION:

Curb Extensions (also known as “choakers” or “bulb-outs”) are a reduction in the number of the lanes at a point along a street. Curb extensions are often used along urban street sections and most effective when paired with vertical elements (1C) and on-street parking (3B).

Curb extensions are utilized to create a narrower pinch-point where drivers subconsciously slow down to navigate through the restrictive area.

LOCATIONS:

Curb extensions are often utilized along one lane or two lane multi-directional streets with on-street parking, curbs, and landscaping.

VALUE ANALYSIS:

OVERALL EFFECTIVENESS



PEDESTRIAN BENEFIT



MULTIPLE LOCATIONS



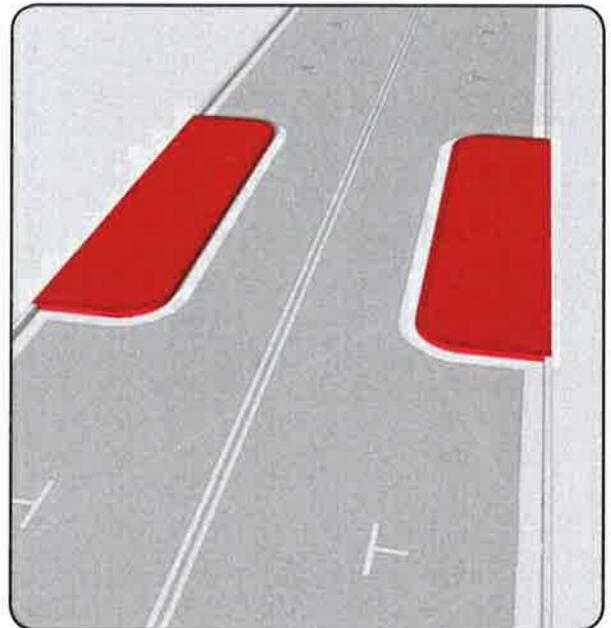
IMPACT TO VEHICLES



COST TO INSTALL



MAINTENANCE OVER TIME



PROS

- WORKS WITH EXISTING INFRASTRUCTURE
- HIGHLIGHTS AND PRIORITIZES PEDESTRIANS
- INCREASES AREA LANDSCAPING

CONS

- EXPENSIVE DUE TO IMPLICATIONS TO STORMWATER INFRASTRUCTURE
- LIMITED APPLICATION

On-Street Parking

DESCRIPTION:

Vehicular speeds fall noticeably with the presence of parked vehicles along a street (whether continuous or intermittent) which can narrow the perceived available width of the travel lanes. The presence of parked vehicles provides additional benefits by creating a safety barrier between pedestrians and traveling vehicles.

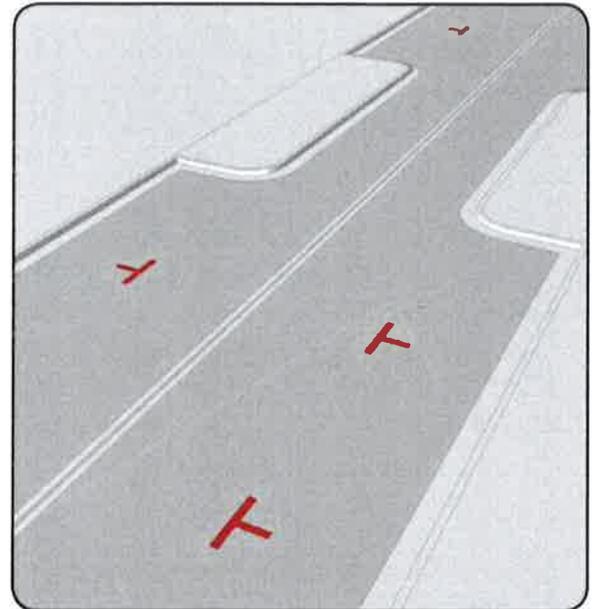
On-street parking helps reduce speeds as drivers navigate more cautiously when forced to be aware of drivers entering and exiting the roadway.

On-street parking is typically configured in parallel spaces but can also be provided in angled or perpendicular configurations. The measure should be used in tandem with curb extensions (3A) to maximize its potential to calm traffic.

LOCATIONS:

On-street parking as a traffic calming measure is most often seen in street sections that have excess width and can accommodate a road diet (3D).

This measure should only be considered if there is a parking generator nearby. Without a generator, added on-street parking will sit vacant and not contribute to calming of the street.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- CREATES PEDESTRIAN SAFETY BARRIER
- UTILIZES EXISTING EXCESS R.O.W
- CAN POTENTIALLY GENERATE REVENUE

CONS

- LIMITED APPLICATION
- EXPENSIVE IF ACQUIRING R.O.W IS REQUIRED
- NEEDS NEARBY PARKING GENERATOR(S)

Chicanes

DESCRIPTION:

A chicane is a change, or forced serpentine, in a street to create a “horizontal deflection.” Drivers must reduce speed to accommodate for the change in the vehicular path.

Chicanes are primarily used along single lane or two lane streets.

- Single Lane Chicanes consist of alternating curb extensions (3A) that work to narrow the road and force vehicles to adjust to a varying path.
- Two Lane Chicanes are primarily used on streets with multi-directional traffic. These chicanes require the use of a central island that acts as a diverter that keep vehicles in their lane of travel.

LOCATIONS:

Chicanes are primarily used along lower traffic count neighborhood streets or to lower the traffic counts along busy local roads and within residential districts. Streets suited for this treatment tend to have speeding problems due to non-local traffic “cutting through” a neighborhood. Streets and roads with significant grade changes are often appropriate for chicanes, as the downward slope tends to have higher rates of speeds.

Chicanes should not be utilized in high traffic areas where back-ups could create conflicts at intersections.

VALUE ANALYSIS:

OVERALL EFFECTIVENESS



IMPACT TO VEHICLES



PEDESTRIAN BENEFIT



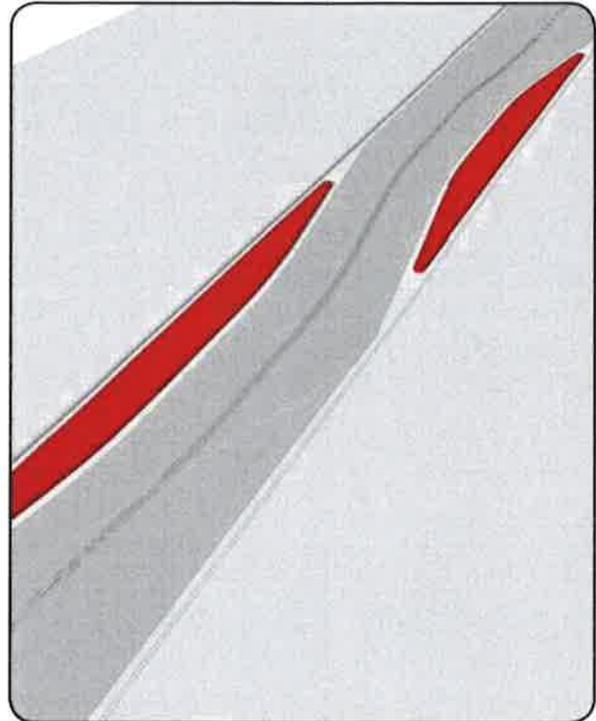
COST TO INSTALL



MULTIPLE LOCATIONS



MAINTENANCE OVER TIME



PROS

- SIGNIFICANTLY REDUCES SPEED
- INCREASES AREA LANDSCAPING
- DISSUADES USE BY NON-LOCAL TRAFFIC
- REDUCES ACCIDENT COUNTS DUE TO SPEED

CONS

- COSTLY TO INSTALL
- CAN CAUSE BACK-UP IN TRAFFIC
- LIMITED TO CERTAIN APPLICATION AREAS

Road Diet

DESCRIPTION:

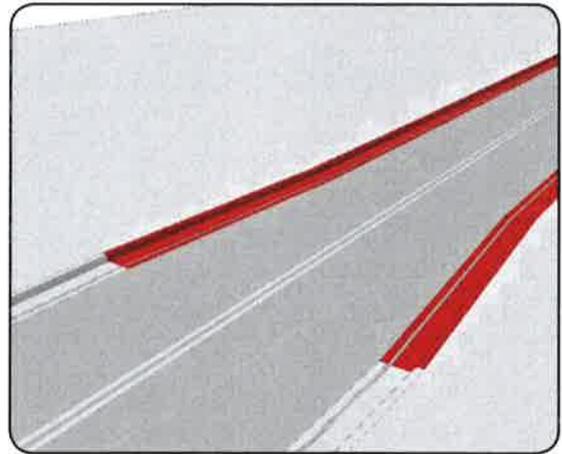
Road Diets take the existing curb to curb (or edge to edge) of a street and reduce its' width to create narrower travel lanes for vehicular traffic.

By reducing the widths of travel lanes, excess width can be converted into medians (2C) or curbside elements such as on-street parking (3B), sidewalks, bike lanes, or additional landscaping (1C).

One approach to establishing a road diet is by using temporary paint and movable barriers to create a pilot or test case. This allows for the results to be studied before investing in a permanent measure.

LOCATIONS:

Only streets with excess pavement (typically within the actual lanes) should be utilized for road diets. The amount of excess pavement paired with surrounding development determines what features will be created with the additional space generated from the road diet.



VALUE ANALYSIS:

OVERALL EFFECTIVENESS



PEDESTRIAN BENEFIT



MULTIPLE LOCATIONS



IMPACT TO VEHICLES



COST TO INSTALL



MAINTENANCE OVER TIME



PROS

- WORKS WITHIN EXISTING INFRASTRUCTURE
- ACCOMMODATES PEDESTRIAN AND BICYCLISTS
- AFFORDABLE
- TEMPORARY OR PERMANENT

CONS

- LIMITED APPLICATION
- CAN BE MET WITH COMMUNITY PUSH BACK

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