City of Norcross Traffic Calming Manual

City of Norcross
Department of Public Works
Division of Highway & Streets
345 Lively Ave.
Norcross, GA 30071

City of Norcross Traffic Calming Manual

1. Application and Intent

1.1 The Primary function of the *Traffic Calming Manual* is to support the livability and vitality of residential areas and assist citizens that are concerned about safety or speeding. The Institute of Transportation Engineers defines traffic calming as the combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming consists of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists.

1.2 Traffic Calming Measures come in a variety of forms:

a) Signage, traffic signals/warning signs, speed limit signs, speed monitoring digital signs, lighting, road markings, rumble and reflector safety strips.

b) Physical alterations to the road: Speed humps or speed tables (*Appendix A)*. Speed humps are installed on a residential street to serve as traffic-calming devices. Properly installed, they should foster a constant speed ranging between 23 to 25 mph. They should not be misconstrued as enforcement mechanisms. According to the Federal Highway Administration, Georgia and Gwinnett DOT guidelines, speed humps should not be installed on street sections with a grade exceeding 8%.

c) Capital Projects: Capital investment projects require long lead times for funding, planning & engineering, potential right-of-way acquisition, and major construction. These include traffic circles, lane narrowing, chicanes, road expansion, and safer sidewalk design (*Appendix A*).

1.3 Traffic Enforcement. In addressing speeding, drivers running stop signs, and violations of other traffic control devices, the neighborhood's first step is to contact the Norcross Police Department's Traffic Enforcement Unit. Traditional traffic enforcement serves to inform the public that speeding is undesirable behavior for which there are consequences. The enforcement unit can deploy speed-monitoring trailers which display the posted speed limit and advise motorists of their speed. This has a positive effect, but it is often effective for a limited time while deployed.

1.4 Legal authority. Physical alterations to the roads, including speed humps, shall be upon authorization of the Mayor and City Council in accordance with City, County, and State Code.

1.5 Street classification. Speed humps will only be considered on streets classified as local, residential streets with a posted speed of 25 mph or less. A physical inspection of the street along with traffic data will be used to determine if speed humps will be effective.

1.6 Speed Humps Defined. Speed humps are a class of traffic calming devices that use vertical deflection to slow motor-vehicle traffic in order to improve safety conditions. Speed hump installation is quicker and considerably less expensive than a Capital Project. Variations include the speed bump, speed hump, speed cushion, and speed table. Speed humps can be made of durable rubber or formed with asphalt/concrete. Speed bumps are not designed for roadways and should be used in parking lots only. *See figure 5.2-1*.

1.7 Standardization of application. In accordance with the general recommendation of the *Manual on Uniform Traffic Control Devices* (MUTCD). Uniformity aids in the recognition and understanding of traffic calming devices. Traffic studies may indicate that speed humps would be ineffective, unnecessary, or unsafe at certain locations.

1.8 Applicability. The City of Norcross *Traffic Calming Manual* is restricted to the jurisdiction of roads/streets within the limits of the City of Norcross. Unincorporated Norcross is governed by Gwinnett County's Department of Transportation.

2. Identification of Safety Concerns

2.1 "Homeowners Association" (HOA), neighborhood group, or individual (if no HOA exists) may report concerns to the Norcross Police Department to investigate speeding, cut-through traffic, or any related safety problems.

2.2 The Norcross Police Department will investigate concerns to validate that an issue warrants monitoring or further action. As part of this process, confirmation will be made for proper signage and appropriate speed limit signs are in fact present and readily seen. The police department can employ patrollers in the area to gather further information and/or cite individuals for traffic violations to improve driver behaviors and traffic law obedience. The traffic enforcement unit may deploy speed-monitoring trailers to warn drivers of their speed as a traffic calming measure.

2.3 To gather further information, if warranted, the Public Works Department may undertake a traffic/speed study to obtain quantifiable data in order to analyze the safety concern.

3. Traffic Complaint Handling Procedures

3.1 Complaint Submission and Methods of Submission. Complaints can be submitted via multiple channels, including:

a) In-person at the Norcross Police Department
b) Phone calls to the Traffic Unit
c) Online submission through the departmental website
d) SeeClickFix
e) Email submissions

3.2 Acknowledgment of Complaints. Upon receipt of a complaint, the Traffic Unit will acknowledge the complaint within 5 business days, informing the complainant that their issue is being reviewed.

3.3 Initial Assessment/Criteria for Assessment. The Traffic Unit will review complaints based on the following criteria:

a) Severity of the issue
b) Frequency of similar complaints
c) Potential risk to public safety

3.4 Prioritization of Complaints
Complaints will be prioritized according to their assessed risk, with high-risk issues addressed first.

4. Traffic and Speed Studies

4.1 A "traffic and speed study" is a method used to analyze the movement of vehicles on a roadway by measuring their speeds at specific locations over a period of time, primarily assessing traffic flow patterns, identifying potential safety concerns, and informing decisions regarding speed limits and road design modifications. These studies don't just measure average speed, but also analyze the distribution of speeds among vehicles to understand how many drivers are exceeding the posted limit or driving significantly slower than others.

4.2 Key metrics analyzed to determine if speeding is occurring beyond the posted speed limit:

a) 95th percentile speed: The speed at or below which 95% of vehicles are traveling.

b) 85th percentile speed: The speed at or below which 85% of vehicles are traveling.

c) 50th percentile speed: The speed at or below which 50% of vehicles are traveling.

d) Average speed: The mean speed of all vehicles measured during the study.

4.3 Universal MUTCD Standard. If the 85th percentile is at or under the posted speed limit, traffic calming measures are not recommended and would serve minimal benefit.

4.4 When to Conduct a Traffic Study. A traffic study will be conducted if a traffic issue cannot be resolved by The Traffic Unit, Public Works Department, or if the issue poses a potential hazard to public safety. Traffic studies are conducted by specialized external consultants.

4.5 A thorough analysis of the data will be conducted by the Departments of Police and Public Works. Once data is analyzed, the results will be provided to the City Manager. If warranted, traffic calming measure recommendations may need to be implemented. Solutions for traffic calming may include reduction to the posted speed limit, area enforcement for compliance, other signage, pavement indicator markers (reflective/non-reflective) and/or as a last resort, physical alterations to roads.

4.6 Follow-Up Monitoring and Procedures. After resolution of a complaint, the Traffic Unit will follow up with the complainant and inform them of the actions taken to rectify the issue or communicate the findings that no issue existed.

4.7 Monitoring Effectiveness. The Traffic Unit will monitor the effectiveness of implemented solutions over time to ensure sustained improvements. If necessary, adjustments will be made based on ongoing monitoring and community feedback.

4.8 Reduction in speed limits and physical road alterations will be brought before a policy work session and subsequent regular council meeting. These traffic calming measures may only be approved by Mayor and Council.

4.9 Removal of a Traffic Calming Measure may be approved under this policy at a later date. Those measures approved by Mayor and Council can only be removed by their approval.

5. Traffic Calming Placement and Implementation

5.1 The Public Works Department will be responsible for procuring and installing any signage and pavement indicator markings.

5.2 Speed Humps and Tables. The Public Works Department will plan and design physical alterations to roads for the placement of speed controlling humps on streets meeting program criteria, and present plan to Mayor and Council using the following guidelines:

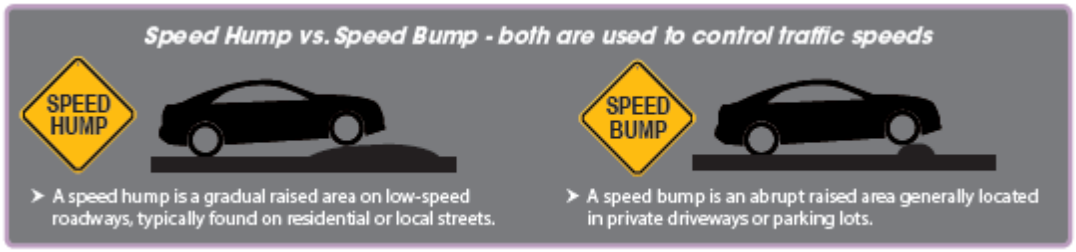


Figure 5.2-1

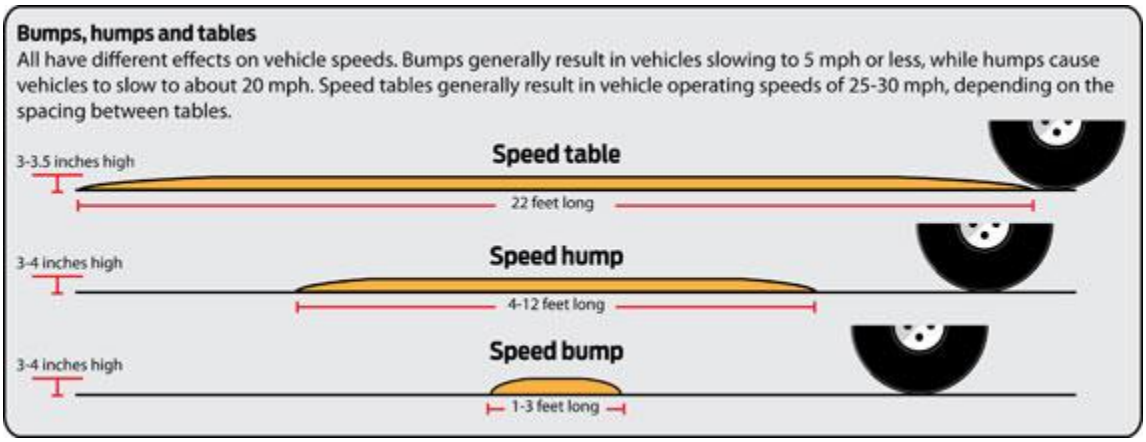


Figure 5.2-2

a) Per the Federal Highway Administration, speed bumps are short jarring obstructions designed to slow cars down to 5-10 MPH and work effectively on alleys, private drives, and parking lots. Speed Humps are less aggressive and result in average speeds of 15-20 MPH and are ideal for residential streets.

b) Grade: Speed humps may, but as a rule, should not be installed on street sections with grades greater than eight percent.

c) Sight Distance: Speed humps should also be placed in locations where sight distance is not an issue. Curves are to be avoided. The humps should be visible from a distance of at least 250 feet using the standard AASHTO measurement procedures.

d) Number of Humps in a Series: Speed humps are not to be used to slow traffic at a given point, but rather to reinforce a safe, consistent speed. For this reason, a single hump is not recommended. Rare exceptions would be for intersections and streets 600 feet in length or shorter. Usually, a series of humps should not exceed three-quarters of a mile. If the street or street section to be considered exceeds a mile, speed humps may be used in conjunction with other traffic-calming devices, such as

traffic circles, thus reducing the number of speed humps necessary to achieve targeted speed reduction.

e) Spacing: Research indicates that spacing humps between 300 and 500 feet apart is most effective.

f) Location: The first hump in a series must be located in a position where it cannot be approached at a high speed from either direction. To achieve this objective, the first hump in a series is typically installed within 100 to 200 feet of a small-radius curve or stop sign. Care should be taken so that humps are not proposed in areas which would conflict with existing infrastructure.

6. General construction guidelines

6.1 Contract requirements. Public Works will contract all asphalt and concrete speed hump installation work. A contract, if awarded, will be an open-end format to provide the requirements on an as-needed basis. The quantities of items disclosed may be increased or decreased, as necessary, to satisfy the needs of the City.

6.2 Materials. All materials furnished and/or installed by the Contractor, shall be acquired from approved sources certified by the Georgia Department of Transportation (GDOT), and shall meet all specifications set forth by GDOT.

6.3 Inspection. The City of Norcross does not commit to furnishing full-time inspection or testing of the work in progress, or at material sources. Absence of inspection and/or testing by the City will in no way relieve the Contractor of his responsibility and liability to provide quality workmanship in accordance with the specifications. City of Norcross does reserve the right to test all materials. Public Works, City Engineer, will contract for the testing when required.

6.4 Progression of work. Contractor shall proceed with the work within (10) working days of receiving written notice by Public Works. Failure to proceed within the prescribed time can result in the awarding of the contract to the next lowest qualified bidder, or re-bidding of the remaining work, as determined by Public Works. Contractor shall provide the City with at least a 24-hour notice of any change in scheduling.

6.5 Traffic Operations. The work shall be performed in such a manner as to maintain at least one lane of traffic at all times. Contractor shall phase construction such that traffic across the completed work shall be minimal until such time that the asphalt has sufficiently cooled and paint sufficiently dried to prevent damage to the work. Upon direction of Public Works, the contractor(s) will limit the hours of operation to avoid peak hour traffic.

6.6 Traffic control. The contractor shall furnish, install, maintain, and remove all necessary traffic signs, barricades, lights, signals, cones and other traffic-control devices, and all flagging and other means of traffic protection and guidance as required by the *Standard Specifications of the Georgia Department of Transportation* and the *Manual on Uniform Traffic Control Devices.* Such work shall be considered incidental to the overall contract, and no additional compensation will be made.

6.7 Signs and markings.

a) The Public Works Department shall be responsible for overseeing the installation of

pavement markings and traffic control signs.

b) Pavement Markings shall be installed in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)* and the *GDOT Signing and Marking Design Guide* specifications.

c) The Public Works Department will ensure placement of “Speed Hump Ahead” and “20 mph” signs at the end of each established district.

6.8 Installing asphaltic concrete speed humps. The procedure for installing the asphaltic concrete speed humps shall be as follows:

a) Immediately prior to construction, thoroughly clean the designated locations of all dirt, loose stone, and other debris, to the satisfaction of the City Engineer.

b) The designated locations shall be tacked in accordance with *Section 413* of the GDOT Standard Specifications. Special care shall be taken to avoid spraying the bituminous tack coat on adjacent curbs, driveways, and miscellaneous structures.

c) Concrete cap blocks shall be set in a straight line and secured to prevent movement during paving. Cap blocks shall not be cracked or broken prior to paving.

d) Apply Super Pave, Level A, Type 1, 9.5mm, asphaltic concrete according to specifications, to the lines and grades specified for the flat-topped speed hump.

e) The placing and rolling operation shall be such that the concrete cap blocks are not displaced, the required compaction is achieved, and the final profile and thickness is within ¼" tolerance of the grade indicated. Any speed hump whose finished grade exceeds the allowable ¼" tolerance will be removed and replaced.

f) The Public Works Department shall schedule the work such that installation at a particular location is completed by the end of the day on which work starts. Speed humps extending across only one lane will not be permitted to be left overnight.

6.9 Thermoplastic asphaltic concrete speed humps. The procedure for installing the thermoplastic in the speed humps shall be as follows:

a) Immediately prior to installation, site shall be thoroughly clean of all dirt, loose stones, and other debris, to the satisfaction of the City Engineer

b) The weather shall be 50 degrees and rising and the pavement will have been dry for 48 hours before installation

c) Thermoplastic must be installed at 90 millimeters thickness

7. Rubber/Concrete-form speed bumps

7.1 Rubber/Concrete-form speed bumps are deemed inappropriate for residential or city roads. They are specifically designed for driveways and parking lots.

7.2 Rubber/Concrete-form attributes:

a) Damages vehicles traveling 10 MPH or more.

b) Rubber/Concrete-formed speed bumps damage and may impede emergency/first responder vehicles.

c) Rubber/Concrete-form speed bumps need constant replacement for speeds in excess of 10 MPH.

8. Capital Projects for Traffic Calming

8.1 It may be necessary for approval of a capital project to address traffic calming. Depending on the scope of the capital project, completion times may range 1-3 years.

8.2 The Department of Public Works will oversee capital project studies, planning, acquisition, and construction.

8.3 These projects require Mayor and Council to approve and appropriate funding. Additional requirements are a traffic engineering study, traffic designs, preliminary plans, potential ROW acquisition, procurement, and final plans for construction.

8.4 Interim traffic calming solutions will need to be implemented to ensure public safety until a project is completed.

Speed Hump

Description:

- Rounded (vertically along travel path) raised areas of pavement typically 12 to 14 feet in length
- Often placed in a series (typically spaced 260 to 500 feet apart)
- Sometimes called road humps or undulations

Applications:

- Appropriate for residential local streets and residential/neighborhood collectors
- Not typically used on major roads, bus routes, or primary emergency response routes
- Not appropriate for roads with 85th-percentile speeds of 45 mph or more
- Appropriate for mid-block placement, not at intersections
- Not recommended on grades greater than 8 percent
- Work well in combination with curb extensions
- Can be used on a one-lane one-way or two-lane two-way street

Design/Installation Issues:

- Typically 12 to 14 feet in length; other lengths (10, 22, and 30 feet) reported in practice in U.S.
- Speed hump shapes include parabolic, circular, and sinusoidal
- Typically spaced no more than 500 feet apart to achieve an 85th percentile speed between 25 and 35 mph
- Hump heights range between 3 and 4 inches, with trend toward 3 - 3 ½ inches maximum
- Often have associated signing (advance warning sign before first hump in series at each hump)
- Typically have pavement markings (zigzag, shark's tooth, chevron, zebra)
- Taper edge near curb to allow gap for drainage
- Some have speed advisories

- Need to design for drainage, without encouraging means for motorists to go around a hump

Potential Impacts:

- No impact on non-emergency access
- Average speeds between humps reduced between 20 and 25 percent
- Speeds typically increase approximately 0.5 to 1 mph midway between humps for each 100 feet Beyond the 200-foot approach and exit of consecutive humps
- Traffic volumes diversion estimated around 20 percent; average crash rates reduced by 13 percent

Emergency Response Issues:

- Impacts to ease of emergency-vehicle throughput
- Approximate delay between 3 and 5 seconds per hump for fire trucks and up to 10 seconds for ambulances with patients

Speed Table/Raised Crosswalks

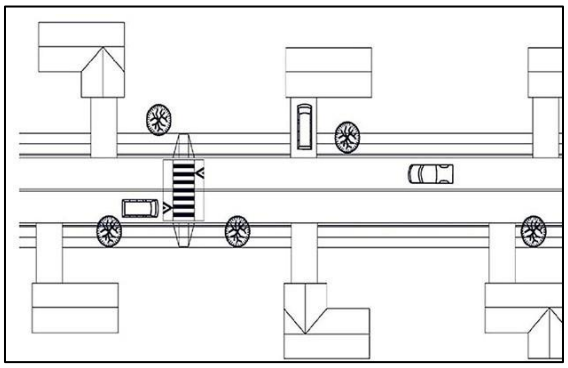
Description:

- Long, raised speed humps with a flat section in the middle and ramps on the ends; sometimes constructed with brick or other textured materials on the flat section
- If placed at a pedestrian crossing, it is referred to as a raised crosswalk
- If placed only in one direction on a road, it is called an offset speed table

Applications:

- Appropriate for local and collector streets; mid-block or at intersections, with/without crosswalks
- Can be used on a one-lane one-way or two-lane two-way street
- Typically long enough for the entire wheelbase of a passenger car to rest on top or within limits of ramps
- Work well in combination with textured crosswalks, curb extensions, and curb radius reductions
- Can be applied both with and without sidewalks or dedicated bicycle facilities
- Not recommended on grades greater than 8 percent

- Typically installed along closed-section roads (i.e. curb and gutter) but feasible on open section



Design/Installation Issues:

- Most common height is between 3 and 4 inches (reported as high as 6 inches)
- Ramps are typically 6 feet long (reported up to 10 feet long) and are either parabolic or linear
- Careful design is needed for drainage
- Posted speed typically 30 mph or less

Potential Impacts:

- No impact on non-emergency access
- Speeds reductions typically less than for speed humps (typical traversing speeds between 25 and 27 miles per hour)
- Speeds typically decline approximately 0.5 to 1 mph midway between tables for each 100 feet beyond the 200-foot approach and exit points of consecutive speed tables
- Average traffic volumes diversions of 20 percent when a series of speed tables are implemented
- Average crash rate reduction of 45 percent on treated streets
- Increase pedestrian visibility and likelihood of driver yield compliance
- Generally not appropriate for BRT bus routes

Emergency Response Issues:

Typically preferred by fire departments over speed humps, but not appropriate for primary emergency vehicle routes; typically less than 3 seconds of delay per table for fire truck

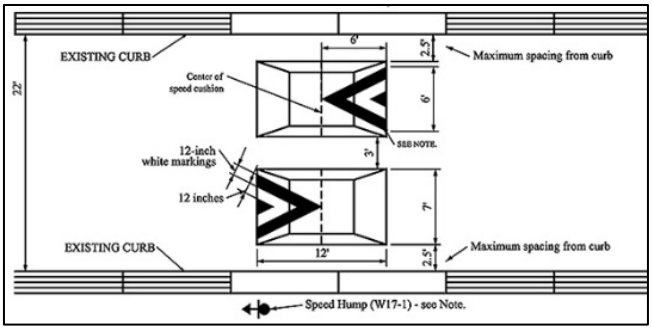
Speed Cushion

Description:

- Two or more raised areas placed laterally across a roadway with gaps between raised areas
- Height and length similar to a speed hump; spacing of gaps allow emergency vehicles to pass through at higher speeds
- Often placed in a series (typically spaced 260 to 500 feet apart)
- Sometimes called speed lump, speed slot, and speed pillow

Applications:

- Appropriate on local and collector streets
- Appropriate at mid-block locations only
- Not appropriate on grades greater than 8 percent



Design/Installation Issues:

- Two or more cushions at each location
- Typically 12 to 14 feet in length and 7 feet in width
- Cushion heights range between 3 and 4 inches, with trend toward 3 - 3 ½ inches maximum
- Speed cushion shapes include parabolic, circular, and sinusoidal
- Material can be asphalt or rubber
- Often have associated signing (advance-warning sign before first cushion at each cushion)
- Typically have pavement markings (zigzag, shark's tooth, chevron, zebra)
- Some have speed advisories

Potential Impacts:

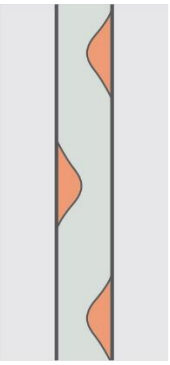
- Limited-to-no impact on non-emergency access
- Speeds determined by height and spacing; speed reductions between cushions

have been observed averaging 20 and 25 percent
- Speeds typically increase by 0.5 mph midway between cushions for each 100 feet of separation
- Studies indicate that average traffic volumes have reduced by 20 percent depending on alternative routes available
- Average collision rates have been reduced by 13 percent on treated streets

Emergency Response Issues:

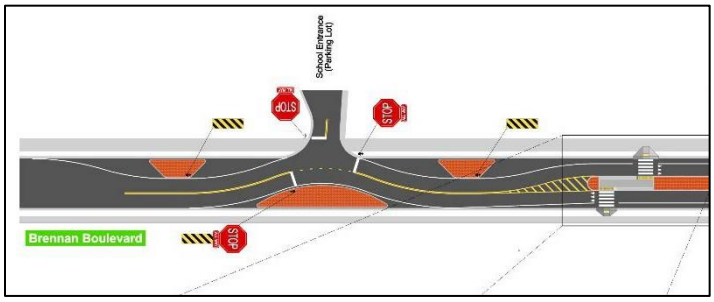
- Speed cushions have minimal impact on emergency response times, with less than a 1 second delay experienced by most emergency vehicles

Chicane



Description:
- A series of alternating curves or lane shifts that force a motorist to steer back and forth instead of traveling a straight path
- Also called deviations, serpentines, reversing curves, or twists

Applications:
- Appropriate for mid-block locations but can be an entire block if it is relatively short
- Most effective with equivalent low volumes on both approaches
- Appropriate speed limit is typically 35 mph or less
- Typically, a series of at least three landscaped curb extensions
- Can use alternating on-street parking from one side of a street to the other
- Applicable on one-lane one-way and two-lane two-way roadways
- Can be used with either open or closed (i.e. curb and gutter) cross-section
- Can be used with or without a bicycle facility



Design/Installation Issues:

- Chicanes may still permit speeding by drivers cutting straight paths across the center line
- Minimize relocation of drainage features
- May force bicyclists to share travel lanes with motor vehicles
- Maintain sufficient width for ease of emergency vehicles and truck throughput

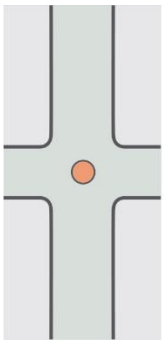
Potential Impacts:

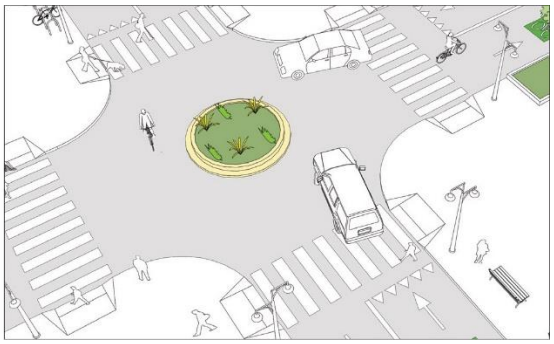
- No effect on access, although heavy trucks may experience challenges when negotiating
- Limited data available on impacts to speed and crash risk
- Street sweeping may need to be done manually
- Minimal anticipated volume diversion from street
- May require removal of some on-street parking
- Provides opportunity for landscaping
- Unlikely to require utility relocation
- Not a preferred crosswalk location
- Bus passengers may experience discomfort due to quick successive lateral movements

Emergency Response Issues:

- Appropriate along primary emergency vehicle routes

Mini Roundabouts





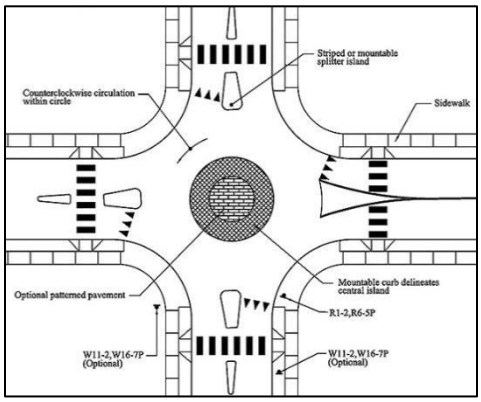
Description:

- Raised islands, placed in unsignalized intersections, around which traffic circulates
- Motorists yield to motorists already in the intersection
- Require drivers to slow to a speed that allows them to comfortably maneuver around them
- Center island of mini roundabout is fully traversable, splitter islands may be fully traversable

Applications:

- Intersections of local and/or collector streets
- One lane each direction entering intersection
- Not typically used at intersections with high volume of large trucks or buses turning left

- Appropriate for low-speed settings



Design/Installation:

- Typically circular in shape, but may be an oval shape
- Controlled by YIELD signs on all approaches with pedestrian crosswalks, if included, one car- length upstream of YIELD bar
- Preferable for roadway to have urban cross section (i.e., curb and gutter)
- Can be applied to road with on-street parking
- Can be applied to roads both with and without a bicycle facility. Bicycle facilities, if provided, must be separated from the circulatory roadway with physical barriers; cyclists using the circulatory roadway must merge with vehicles. Bicycle facilities are prohibited in the circulatory roadway to prevent right-hook crashes.
- Key design features are the fastest paths and path alignment.

Potential Impacts:

- Slight speed reduction
- Little diversion of traffic
- Bicycle and motorist will share lanes at intersections because of narrowed roadway
- Large vehicles/buses usually drive over the center island for left turns

Emergency Response:

- Emergency vehicles maneuver using the center island at slow speeds

Smaller Traffic Circle

Description:

- Raised islands placed in unsignalized intersections around which traffic circulates
- Approaching motorists yield to motorists already in the intersection
- Require drivers to slow to a speed that allows them to comfortably maneuver around them
- Approaches not designed to modern roundabout principals - no deflection

Applications:

- Appropriate at intersections of local streets
- One lane each direction entering intersection
- Not typically used at intersections with high volumes of large trucks or buses turning left

- appropriate for both one-way and two-way streets in urban and suburban settings

Design/Installation Issues:

- Typically circular in shape but may be an oval shape
- Usually have landscaped center islands
- Recommend YIELD signs on all approaches
- Preferable for roadways to be closed-section (i.e. curb and gutter)
- Can be applied to roads with on-street parking
- Can be applied to roads both with and without dedicated bicycle facilities; bike lanes not striped in circulatory roadway
- Key design features include: offset distance (distance between projection of street curb and center island), lane width of circulatory roadway, circle diameter, and height of mountable apron for large vehicles

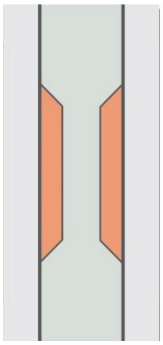
Potential Impacts:

- Minimal anticipated traffic diversion
- Bicyclist and motorists will share lanes at intersections because of narrowed roadway
- Large vehicles/buses usually not able to circulate around center island for left turns
- Landscaping needs to be designed to allow adequate sight distance, per AASHTO
- Minimize routing of vehicles through unmarked crosswalks on side-streets
- May require additional street lighting

Emergency Response Issues:

- Emergency vehicles maneuver intersections at slow speeds
- Constrained turning radii typically necessitates a left turn in front of the circle for large vehicles

Choker/Pinch-point

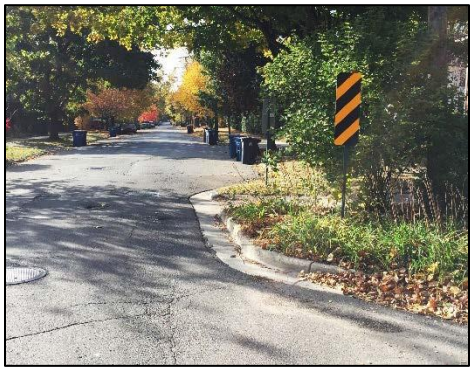


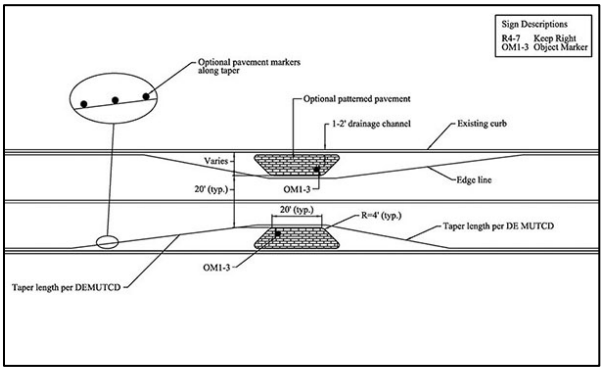
Description:

- Curb extension is a lateral horizontal extension of the sidewalk into the street, resulting in a narrower roadway section
- If located at an intersection, it is called a corner extension or a bulb-out
- If located midblock, it is referred to as a choker
- Narrowing of a roadway through the use of curb extensions or roadside islands

Applications:

- Can be created by a pair of curb extensions, often landscaped
- Encourages lower travel speeds by reducing motorist margin of error
- One-lane choker forces two-way traffic to take turns going through the pinch point
- If the pinch point is angled relative to the roadway, it is called an angled choker
- Can be located at any spacing desired
- May be suitable for a mid-block crosswalk
- Appropriate for arterials, collectors, or local streets





Design/Installation Issues:

- Only applicable for mid-block locations
- Can be used on a one-lane one-way and two-lane two-way street
- Most easily installed on a closed-section road (i.e. curb and gutter)
- Applicable with or without dedicated bicycle facilities
- Applicable on streets with, and can protect, on-street parking
- Appropriate for any speed limit
- Appropriate along bus routes
- Typical width of 6 to 8 feet; offset from through traffic by approximately 1.5 feet
- Locations near streetlights are preferable

- Length of choker island should be at least 20 feet

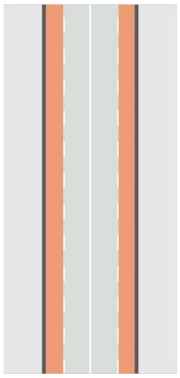
Potential Impacts:

- Encourages lower speeds by funneling it through the pinch point
- Can result in shorter pedestrian crossing distances if a mid-block crossing is provided
- May force bicyclists and motor vehicles to share the travel lane
- May require some parking removal
- May require relocation of drainage features and utilities

Emergency Response Issues:

- Retains sufficient width for ease of use for emergency vehicles

Road Diet/Lane Narrowing



Description:

- Revision of lane use or widths to result in one travel lane per direction with minimum practical width, with goal of reducing cross-section; common application involves conversion of four-lane Two-way road to three-lane road – two through lanes and center two-way left-turn lane (TWLTL)
- Can also involve narrowing of existing travel lanes
- Alternate cross-section uses can include dedicated bicycle facilities, left-turn lanes, on-street parking, raised medians, pedestrian refuge islands, sidewalks, etc.
- Applications:
- High likelihood of acceptability for nearly all roadway functional classifications
- Can be applied in urban, suburban, or rural settings
- Appropriate for most common urban speed limits
- Can be applied at/near intersections or along road segments
- Appropriate along bus routes

Design/Installation Issues:

- Must consider transitions from adjacent roadway sections and through intersections
- AADT can be considered but is not the primary volume factor that needs to be evaluated

Potential Impacts:

- Usually reduces number of available travel lanes – impacts demand that can be accommodated; typical acceptable threshold of 1000 vehicles per direction during peak hour
- Reduction of through lanes tends to reduce speeds
- Can improve pedestrian crossing ease and safety
- Can improve bicycle accessibility if travel lanes can be used for shoulders/bike lanes instead
- Emergency Response Issues:
- Generally accepted from emergency services; leaves available space for through flow of
- emergency vehicles