Section 4.0.0
Traffic Calming

Subject: Residential Subdivision Traffic Calming Policy and Procedure

I. **Applicability:** This policy applies to all residential subdivision streets in the City of Broken Arrow.

II. **Implementation:** This policy is effective upon approval by the City Council. This policy will be implemented upon request from a citizen or determination of a safety hazard by the City staff.

III. **General:**

Because of high traffic speeds and high volumes of through traffic encountered on many residential roads in pre-World-War II communities (characterized essentially by grid pattern street systems), newer residential communities, planned their streets with curvalinear alignments and cul-de-sacs in a well-defined hierarchical system. Although these newer concepts reduced the quantity of "foreign traffic" on most residential roads, it did not eliminate it on all of them. Furthermore, the curvalinear street systems did not accomplish the reduction in vehicle speeds that were envisioned when the design changes were implemented.

The residential speed limit in the City of Broken Arrow is 25 mph. If this speed limit were obeyed, the resulting pattern of the actual speeds would ideally follow a bell curve with a mean speed of 20 mph and an 85th percentile speed of 25 mph. Unfortunately, the 25 mph speed limit is seldom obeyed. For example all of the traffic speed surveys conducted in 1996 and 1997 show an 85th percentile speed above 25 mph. The actual speeds have ranged from 60 mph to 15 mph with 85th percentile speeds from 29 to 33 mph. This excessive speed in subdivisions has resulted in a heavy volume of citizen requests for action to reduce speeding in subdivisions.

The City of Broken Arrow has gone through an evolutionary process to arrive at this traffic calming policy. Initial attempts were centered around Stop sign installation. Evaluation of these actions showed the Stop signs were not effective and often presented a greater risk due to drivers failing to stop. The installation of Stop signs where they were not warranted also creates a liability issue for the city. There followed a series of tests with speed traps, signage, painting lines, chatter strips, speed humps, road narrowing, and traffic circles. This policy and procedure is a result of the evaluation of the various tests conducted by the City and a review of literature on tests conducted by other cities. This policy represents the current best technology for traffic calming in residential neighborhoods. As the technology changes, this policy will be updated to reflect any improvements.

IV. **Definitions:**

1. **Median or pedestrian refuge islands** - Raised islands placed in the middle of the road displacing a vehicle to the right. These can be oval or elliptical shaped. Those islands used at a crosswalk to provide a pedestrian refuge increase pedestrian safety by allowing pedestrians to cross one direction of traffic flow at a time.

2. **Problem Street -** A section of street with a traffic problem. Normally defined by naming the street and the cross streets where the problem starts and ends. For example: Main Street from Broadway to Dallas.

3. **Raised intersections or crosswalks -** Similar to speed humps but typically cover a longer distance. Used to slow vehicles, as well as to indicate to motorists that they are entering a residential area or to emphasize a crosswalk location. These are typically constructed with contrasting paving materials. This can be a relatively costly technique and will generally only be considered for special applications.

4. **Enhanced Speed Humps** – 5 to 6 inches high, parabolic or flat-topped raised pavement, typically 24 feet long in the direction of travel. This type of speed hump is used only after standard speed humps have failed to achieve the desired reduction in speed. They are placed in the same manner as standard speed humps.

5. **Standard Speed Humps** – 4 to 5 inches high, parabolic or flat-topped raised pavement, typically 24 feet long in the direction of travel, and spaced every 200 to 600 feet. Humps are generally only applicable on streets with direct residential frontage and with posted speed limits or 25 or less. An attempt is made to locate humps at property lines - they are not installed on sharp curves or hill crests where visibility may be restricted, on steep grades, in intersections or driveways. Humps are designed to accommodate larger vehicles such as school buses and fire trucks.

6. **Traffic Circles** - Raised circular islands placed in the center of a four leg intersection. They are designed to have a slowing effect on vehicles in a range of 200 to 500 feet and to control right of way at the intersection (approaching vehicles must yield to traffic in the circle). All vehicles except emergency vehicles must travel to the right of and counterclockwise around the circle.

V. **Policies:**

1. Stop Signs will not be used for speed control.

2. When a residential area requires traffic calming action, the least restrictive measure or combination of measures that are effective will be employed.

3. Traffic Calming Measures employed by the City are as follows (listed from least to most restrictive):
   a. Speed Signs and Street Painting
   b. Special zero tolerance enforcement by Police Department
   c. Standard Speed Humps

4. Traffic calming measures V 3a through V 3b may be implemented or stopped/removed by the City Staff.

5. Traffic calming measures V 3c require City Council approval before installation or removal, except for:
   a. Removal to install a greater restraint measure or,
   b. Removal due to street reconstruction or resurfacing (section VIII).

6. Traffic calming measures will normally be undertaken only upon request by 75 percent or more of the citizens, living on the property (property includes citizens living in multifamily housing) adjacent to the street.

7. Only streets that meet the specific criteria in this policy will be considered for traffic calming measures.

8. Traffic calming measures will normally be employed in order starting from least restrictive and going to most restrictive. Where a less restrictive traffic calming measure, will enhance the more restrictive measure being installed, it will be left in place.

9. Implementation of the Traffic Calming Program on non-standard problem streets will be sponsored by the Street Division. Upon notification of a traffic problem, confirmation that there are sufficient vehicles on the street, and the speed of the vehicles warrant traffic calming measures, the implementation of the traffic calming program will be automatic after approval by the City Council

VI. **Responsibilities:**

1. City Council: As necessary, review and approve installation or removal of traffic calming devices and hear appeals from sponsors.

2. City Manager: Manage the traffic calming program through the appropriate staff departments.

3. All Staff Departments will:
   a. Receive complaints on excessive traffic and speeding.
   b. Inform citizens of the traffic calming policy and how to use the policy.

4. The City Engineer will: When required, prepare designs for pedestrian islands, street narrowing, traffic circles, raised intersections or crosswalks, and special speed humps.

5. The Police Department will:
   a. Provide background information on streets being studied.
   b. Provide officers for zero tolerance enforcement and street evaluations as required.

6. The Street Division Department will:
   a. Perform traffic studies for stop sign installation or removal.
   b. Perform traffic studies for traffic signal installation or removal.
   c. Receive and process requests for traffic calming actions.
   d. Perform required traffic counts and speed studies.
   e. Budget for and construct required traffic calming devices.

VII. **Procedure:**

1. Problem Area Identification: Either the homeowners on the street or the City Staff may identify an area as a problem. If the problem is identified by a City Staff member then a sponsor person living on the problem street must be found before the project can proceed beyond signage and painting and/or zero tolerance enforcement.

2. Upon receipt of the sponsor's name, the Street division will conduct a 24-hour traffic count and a 12-hour speed survey on the proposed street. Action subsequent to these counts will be one of the following:

   a. A street that has 500 or more vehicles in a 24 hour period and an 85th percentile speed above 30 mph, will automatically be entered in the program.

b. A street that has an 85th percentile speed below 30 mph, will automatically be excluded from the program.

c. A street that has less than 500 vehicles in a 24 hour period will automatically be excluded from the program.

3. A determination that a street will not be enrolled in the Traffic Calming program may be appealed to the City Council.

4. Upon determination that a street meets the criteria for enrollment in the Traffic Calming program, the Street Division will notify the sponsor of the status of their request. The sponsor will be informed of the requirement for a Traffic Calming Petition, Verification Statement, and Homeowners Association Endorsement. The Street will supply sample forms to the sponsor. If the subdivision does not have a homeowners association then all references to a homeowners association are not applicable to that subdivision.

5. While the sponsor is preparing the Traffic Calming Petition, Verification Statement, and Homeowners Association Endorsement, the Street Division will initiate traffic calming procedures V 3a and V 3b.

6. The sponsor will deliver the completed paperwork to the Operations Building at 485 N Poplar.

7. Upon receipt of the completed paper work the Street Division will take the paper work to the City Council, for approval, at the next reasonable date the Council meets. The Street Division will notify the sponsor of the date and time the City Council will vote on the traffic calming measures. Following the City Council meeting, the Street Division will notify the sponsor of the City Council's decision. If the City Council decides that traffic calming measures are not required, the project will be stopped at that point.

8. Upon receipt of the City Council's approval, the Street Division will initiate the traffic calming measures in the order shown in paragraph V 3 above. After each step is taken a three (3) to five (5) week waiting period will be observed and then a speed survey will be conducted. If the 85th percentile speed has dropped to acceptable levels, the traffic calming program will be stopped at that level.

9. The Street Division may reopen a traffic calming project within 18 months after it was approved by the City Council. Reopening a project will be done when a speed survey shows that the measures used are no longer effective.

10. If a closed traffic calming project is older than 18 months it will require recertification and approval by the City Council.

VIII. **Removal of Traffic Calming Measures:**

If after three (3) months the citizens living on the problem street desire to have the traffic calming measure(s) removed, they must petition the City Council for removal of the traffic calming measure(s). Removal of traffic calming measures will be accomplished using the same procedure as for installation. The only change will be the wording of the documents. Removal will require the approval of 75 percent or more of the citizens living on property adjacent to the problem street and the endorsement of the removal request by the Homeowner's Association, if one exists for the affected neighborhood. When a street reconstruction or resurfacing project is scheduled to be performed on a problem street that has speed humps, the Streets and Stormwater Department will notify the citizens living on property adjacent to the problem street at least 30 days in advance of the start of the project that the speed humps will not initially be reconstructed, and that if the affected citizens desire reinstallation of the speed humps after the street project is completed, they may initiate the request for reinstallation of speed humps by following the procedure defined in this Policy. Upon satisfaction of the criteria required, speed humps will be reconstructed on the problem street.

IX. **Funding:**

Funding: Based on information gained in the initial years of operation and the projected number of traffic calming projects the Departments will add funds to the appropriate accounts for traffic calming.

X. **Recording and Reporting:**

The Street Division with input from other Departments will maintain the form at appendix 6 on each project.

XI. **Appendices:**

1. Reserved
2. Sample Traffic Calming Petition
3. Sample Verification Statement
4. Sample Endorsement Statement
5. Project Prioritization Criteria
6. Traffic Calming Project Report
7. Traffic Calming Measure Installation Criteria

Appendix 2 - Sample Traffic Calming Petition

Location:	
Contact Person:	
Address:	Phone Number Home: Work:

We, the undersigned hereby petition for the installation of traffic calming devices up to and including speed humps on _____ between _____ and _____ according to policies and procedures established by the City of Broken Arrow.

NOTES:

1. Before signing you must receive a flyer titled ACity of Broken Arrow Traffic Calming Programs and you should look at the speed bumps listed in the flyer.
2. If you sign this petition and later want to have your name removed consult the flyer for the removal procedure.
3. The street mentioned above all will be considered for traffic calming device installation only if the signatures below represent 75 percent or more of all households adjacent to the street. Only one signature from each household will be considered.

Address	Name (Please Print)	Signature	Whether Owner or Renter	Phone Number Home Work	Ok if Installed in Front of My Residence (Please Initial)

Appendix 3 - Sample Verification Statement

There are a total of _____ properties adjacent to _____between _____and _____. There are ___valid signatures on the speed hump petition which represent ___ percent of properties adjacent to the street within the section mentioned above. I verify that the signatures on the Traffic Calming petition are valid and only one signature per household has been considered in the above mentioned percentage.

Date:_____

_____
(Signature of Sponsor)

Name:_____

Address: _____

Appendix 4 - Sample Endorsement Statement

In a meeting held on the ___ day of _____, 19 __ the _____Homeowners Association approved and endorsed the Traffic Calming project on_____ from _____ to _____. The association acknowledges that because of installation of Traffic Calming Devices up to and including speed humps on the above mentioned street there may be an increase in traffic on nearby streets.

The sponsor has confirmed that signatures on the Traffic Calming petition are valid and represent 75 percent of the households/businesses adjacent to the street within the section mentioned above.

Date: _____ 1. Signature: _____
Name:

Position:

2. Signature: _____
Name:

Position:

Appendix 5 - Project Prioritization Criteria

1. **General:** Traffic Calming projects will be ranked according to the criteria established in this appendix. Projects will be assigned points on the basis of existing speeds and volumes, average number of speed related accidents reported to the Broken Arrow Police Department (BAPD), and presence of schools and/or other special pedestrian generators in the area. The project accumulating the greatest number of points will be considered to have the highest priority. Among projects with the same rank, higher priority will be given to the one with the earliest application date.

2. **Priority Criteria:**

   a. Accident Criteria - All accidents considered for point assignment must be speed related accidents within the BAPD data base and on the project street, either at intersections or at mid-block locations.

Total Number of Reported Accidents Over a Period of 3 Consecutive Years	Points Assigned
3	1
4-6	2
7-9	3
10-12	4
13 or more	5

   b. **Speed Criteria** - The speed criteria considers the difference between the 85th percentile speed during the 12 hour period from 7:00 a.m. to 7:00 p.m. and regulatory speed limit (85th percentile speed is the speed at or below which 85 percent of the drivers are traveling).

Speed Difference Between 85th Percentile Speed and Regulatory Speed Limit (mph)	Points Assigned
5-7	4
8-10	6
greater than 10	8

Appendix 5 - Project Prioritization Criteria (Continued)

c. **Traffic Volume Criteria -** Traffic volumes (two-way) during the peak hour are considered.

Hourly Volume (veh/hour	Points Assigned
<50	0
50-225	1
226-300	2
301-375	3
376-450	4
greater than 450	5

d. **Type of Neighborhood Criteria:** Points will be assigned to the project if there are schools and/or special pedestrian generators (such as parks, elderly housing, community center, shopping areas).

(1) Schools within a 1/2 mile radius of the project street. 1 point

(2) Special pedestrian generators within a 1000 feet radius of the project street. 1 point

(3) Absence of sidewalks on the project street. 1 point

(4) Collector Street 1 point

Appendix 6 - Traffic Calming Project Report

1 Project Area _____(Street Name)

from _____ to _____

2. Critical Dates:
   a. Initial Contact:
   b. Traffic Count:
   c. Speed Survey:
   d. Signage and Painting:
   e. Zero Tolerance Enforcement:
   f. City Council Approval:
   g. Speed Survey:
   h. Chatter/Rumble Strips:
   i. Speed Survey:
   j. _____ Constructed:
   k: Speed Survey:
   l. _____ Constructed:
   m. Speed Survey:
   n. Project Closed:

3. Speed Survey Costs: (Additional Subparagraphs Added As Required)

   a. Date:
   b. Labor Costs:

Employee Number	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

Appendix 6 - Traffic Calming Project Report (Continued)

c. Equipment Costs:

Unit	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

d. Total Cost: $_____

4. Zero Tolerance Enforcement: (Additional Subparagraphs Added As Required)

a. Date:

b. Labor Costs:

Employee Number	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

c. Equipment Costs:

Unit	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

d. Total Cost: $_____

Appendix 6 - Traffic Calming Project Report (Continued)

5. Signage and Painting:
   a. Date:
   b. Labor Costs:

Employee Number	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

   c. Material Costs:

Description	**Unit Cost**	**Number of Units**	**Total Cost**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
		Total:	

   d. Equipment Costs:

Unit	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

   e. Total Cost: $_____

Appendix 6 - Traffic Calming Project Report (Continued)

6. Physical Barrier Construction:
   a. Date:
   b. Labor Costs:

Employee Number	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

   c. Material Costs:

Description	**Unit Cost**	**Number of Units**	**Total Cost**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
		Total:	

   d. Equipment Costs:

Unit	Hours	Total Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Total:	

   e. Total Cost: $_____

7. Total Project Cost **$**_____

Appendix 7 - Traffic Calming Measure Installation Criteria

1. Traffic Signs and Painting:
   a. General: Traffic Signs and painting are used to alert drivers to the need to slow down in a residential neighborhood. All signs and painting will be installed in accordance with the **Manual on Uniform Traffic Control Devices,** (MUTCD) (current edition). The traffic signs and painting normally used for traffic calming are listed below.

   b. Speed Limit Signs: Speed limit signs will normally be placed at points of entry into the subdivision. The sign will be in the block adjacent to the arterial street. When there is a separation between subdivisions a speed limit sign will be posted on the street connecting the subdivisions.

   c. School Zone, Crosswalk, Yield and Stop Signs will be placed where warranted as outlined in the **MUTCD.**

   d. Unwarranted Signs: Where signs that do not meet the requirements of the **MUTCD** have been installed, these signs will be removed as part of the traffic calming project.

   e. Painting: Painting will normally consist of crosswalks, message to drivers (ie Slow, 25 MPH, etc.), marking areas of no travel, and adding visibility to other traffic calming devices. Painting will be in accordance with the MUTCD.

2. Median or Pedestrian Refuge Islands:

   a. General: These types of traffic calming devices are used to narrow the roadway and slow vehicles. They also provide pedestrians a place to stop while crossing the street or a planter in the center of the street. City Council approval is required.

   b. Design Criteria: Due to the nature of this type of traffic calming measure, it will be specially designed for each location. The following minimum criteria will be followed:
      (1) Minimum Traffic Lane after construction: 11.0 feet
      (2) Location: Corners and mid-block only.
      (3) Curbing: A six (6) inch barrier curb will be used.
      (4) All pavement inside the curb to be removed and curb backfilled with topsoil.
      (5) A one (1) inch copper line to be installed to allow watering of landscape materials.

c. Signage and Painting: Signage indicating the road narrows will be placed before the traffic reaches the island.

3. Street Narrowing:

a. General: Street narrowing consists of extending the curb line into the street to narrow the travel way. This traffic calming device reduces speeds by displacing vehicles horizontally and narrowing the roadway. Street narrowing will be installed with barricades for 30 days prior to final construction to allow for citizens review. The completed project will reduce on street parking. City Council approval is required.

b. Design Criteria

(1) Minimum Roadway (one (1) lane) width: 11 feet
(2) Curb to be six (6) inch barrier type.
(3) Minimum taper to be 10 to 1.
(4) All pavement inside curb to be removed and curb backfilled with topsoil.
(5) A one (1) inch copper line to be installed to allow watering of landscape materials.

c. Location Considerations: Same as Speed Humps see paragraphs 7b(4) and 7b(5).

d. Signage and Painting

(1) A road narrows signs will be placed in advance of the road narrowing.
(2) "No Parking" signs will be placed on the taper and the narrowed portion of the road.
(3) The area down lane from the narrowed lane will have a painted taper back to full roadway width.

4. Traffic Circles:

a. General: Traffic circles will be used whenever a four way intersection is on the problem street. The traffic circle displaces traffic horizontally and therefore does less harm to vehicles. Traffic circles will be installed with barricades for 30 days prior to final construction to allow for citizen review. City Council approval is required.

Appendix 7 - Traffic Calming Measure Installation Criteria (Continued)

b. Design Criteria

(1) Four way intersection with a minimum of one (1) 36 foot wide street.
(2) Intersection located near the center of the problem area.
(3) Minimum diameter (Back of curb to back of curb): 19 feet
(4) Curb to be six (6) inch barrier type.
(5) All pavement inside curb to be removed and curb backfilled with topsoil.
(6) A one (1) inch copper line to be installed to allow watering of landscape materials.

c. Painting and Signage: Standard signage for a traffic circle to be installed (four (4)- yield signs and four (4) - direction arrows,

5. Raised Crosswalks and Intersections:

These are very special case traffic calming devices and will be used primarily in new construction, in accordance with the design engineer's specifications. If used in an existing subdivision, the Engineering Department will design the device and the design will be reviewed with the Homeowners Association (if applicable) prior to installation. City Council approval is required.

6. Speed Humps

a. General: Speed humps are normally the last traffic calming measure to be installed. The speed hump will slow traffic to 20 to 25 MPH through vertical displacement of the vehicle. Since there is vertical displacement involved there is a certain amount of wear on vehicles. City Council approval is required

b. Design Criteria

(1) The flat-topped speed hump will be approximately 24 feet long consisting of a 12- foot long plateau with 6-foot long approaches on either side. This flat-topped speed hump will be 4 to 5 inches in height.

(2) On streets with barrier curbs, humps will extend fully across the road from curb joint to curb. A 12-inch minimum taper may be considered for drainage. For humps installed on non-curbed roadways special treatment such as delineator posts will be considered to prevent vehicle run-arounds.

Appendix 7 - Traffic Calming Measure Installation Criteria (Continued)

(3) Spacing and Location

(a) Speed humps will usually be placed between 200 feet to 600 feet apart. Other spacing may be used based upon engineering judgement. The following guidelines will be considered when determining speed hump spacing.

(b) On single short blocks (300 feet to 500 feet) a single hump will be positioned near mid-point.

(c) On single blocks of moderate length (500 feet to 1000 feet) a two hump configuration at the third points will be used.

(d) On very long blocks (1000 feet to 1600 feet) three or more humps may be necessary.

(e) On lengthy continuous street segments or for humps provided over a series of blocks, interior humps will be placed 400 feet to 600 feet apart.

(4) Location Considerations:

(a) A speed hump should not be located in front of a driveway or within an intersection. Speed humps should not be located within 250 feet of a traffic signal or within 50 feet of an intersection.

(b) Speed humps should not be located over, or contain, manholes, or be located adjacent to a fire hydrant.

(c) For humps located near drainage inlets the hump should be placed just downstream of the inlet. If this is not feasible, special treatment should be considered for drainage.

(d) If possible, humps should be located on property lines rather than directly in front of a residence.

(e) The advantage of existing or planned street lighting should be taken when determining hump locations.

Appendix 7 - Traffic Calming Measure Installation Criteria (Continued)

(f) A speed hump should not be located in front of a property if the occupant objects to its placement or, in the case of multiple dwellings if majority of the households on the property object to its placement. Speed hump placement will ultimately be determined by Street Department personnel based upon consideration of residential requests, the street makeup and/or its characteristics.

c. Signage and Painting

(1) A warning sign will be installed on the approach to each speed hump.

(2) Six (6) inch wide crossing white lines will be painted over the surface of the hump.