City of Richmond

Report to Committee

To PW & T - Aug 20, 2003

To:	Public Works and Transportation Committee	**Date:**	July 24, 2003
From:	Gordon Chan, P. Eng. Director, Transportation	**File:**	6450-09
Re:	**TRAFFIC CALMING GUIDELINES**		

Staff Recommendation

1. That the proposed Traffic Calming Guidelines with respect to evaluation and prioritization criteria, as discussed in the attached report, be approved.

2. That staff monitor the results of the Guidelines for a 2-year period and report back on the overall impact of the Guidelines on the City's traffic calming process.

Gordon Chan, P. Eng.
Director, Transportation
(4021)

Att. 2

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CONCURRENCE OF GENERAL MANAGER

1050320

Staff Report

Origin

Currently, requests for neighbourhood traffic calming are addressed on an *ad hoc* basis. Staff assess these requests by initiating a traffic study and developing options to address any issues identified by the study. Consultation with area residents is a fundamental part of this process. The traffic calming approval policy endorsed by Council in October 2002 streamlined the implementation process by establishing criteria that determine if a project requires Council approval. Over the past several years, the City has implemented about 15 traffic calming measures in various neighbourhoods. Experience to date suggests that these applications have improved local area traffic safety by varying degrees. Notwithstanding, as the number of requests has increased in recent years, staff reviewed the necessity and prudence of establishing formal traffic calming guidelines to standardize the analysis and application of traffic calming measures. This report reviews the City's current traffic calming practice and that of other jurisdictions and proposes a set of traffic calming guidelines for Council approval.

Analysis

1. What is Traffic Calming?

Traffic conditions on residential streets can greatly affect neighbourhood liveability and safety. Traffic calming seeks to address traffic safety concerns related to speed violations, through traffic intrusions, pedestrian and bicycle safety, and other undesirable driving and parking behaviour by altering driver behaviour primarily through physical measures. These measures improve safety by increasing motorist awareness of other street users and reducing vehicle speeds, volumes and conflicts. Studies worldwide have shown that traffic calming measures can reduce collision rates and enhance traffic safety. Traffic calming is intended to address the following concerns:

- *Excessive Vehicular Speeds* – excessive speed creates a safety concern, increases the risk for pedestrians and cyclists using the street and creates more noise;
- *Through Traffic("Rat Running")* – non-local traffic travelling through a neighbourhood increases traffic volumes, which can create congestion, cause delays for pedestrians, cyclists and local road users, and increase noise and vehicle emissions; and
- *Conflicts between Street Users* – excessive vehicle speeds and volumes, geometric deficiencies and poor sightlines can create conflicts between motorists, cyclists, pedestrians and other street users.

2. Why are Traffic Calming Guidelines Needed?

The City currently addresses traffic calming requests on an *ad hoc* and independent basis. Staff undertake a traffic study, develop options to address any issues identified, and consult with area residents. The traffic calming approval policy endorsed by Council in October 2002 has streamlined the implementation process by establishing criteria that determine if a project requires Council approval. However, as the number of requests has increased over the past several years, it is prudent to establish formal guidelines to ensure consistency in the analysis and application of traffic calming measures, and prioritize requests to address funding constraints. The objectives of the traffic calming guidelines are to provide a framework that:

- standardizes the evaluation and implementation of traffic calming measures, including the identification of eligible projects;
- enables the prioritization of multiple requests for neighbourhood traffic calming;
- places the role of public consultation within the evaluation and implementation process; and
- optimizes existing City resources.

3. Current City Traffic Calming Practice

The following steps outline the City's current traffic calming practice.

(1) *Define Issue* – The City initiates a traffic study and reviews feedback from area residents regarding local traffic safety issues. Traffic speeds and volumes, reported traffic accident data and other related information are collected and assessed.

(2) *Develop Options* – Options to address the identified issues are developed. It may be possible to enhance traffic safety by increasing speed and parking regulation enforcement, educating those causing the problem and/or implementing regulatory measures. If non-engineering measures are not adequate, then physical measures are considered.

(3) *Report to Council (if required)* – per the Traffic Calming Approval Policy, a Council report is required only if the recommended measures meet any of these conditions: (a) involve physical changes to arterial or collector streets; (b) have significant costs relative to similar projects; (c) are controversial within the neighbourhood; or (d) require funding beyond the current program year. Minor traffic calming measures do not require a report to Council (i.e., those that are implemented on local roads or lanes, do not involve physical changes to arterial or collector streets, and have majority resident support).

(4) *Consultation with Area Residents* – staff consult with area residents to determine if the proposed project is satisfactory. If most residents support the proposed project, the design is refined to incorporate comments received. Otherwise, new options are considered based on feedback from resident surveys.

(5) *Further Report to Council (if required)* – if an initial report to Council was required and residents support the project, staff seek approval from Council to proceed with implementation and monitor the effectiveness of the project for one year.

(6) *Implementation* – Traffic safety projects are funded from the Capital Works Program. In some cases, these measures are implemented as part of the requirements for a new development and/or a financial contribution towards the project may be made by an external agency.

(7) *Monitoring* – Staff monitor traffic conditions (including speed, traffic volume and accidents) for one year to evaluate the effectiveness of the project. If the project has not improved traffic conditions on the street, other actions may be considered.

4. Traffic Calming Measures and Applications

The *Canadian Guide to Neighbourhood Traffic Calming* (prepared for the Transportation Association of Canada and the Canadian Institute of Transportation Engineers) identifies 25 traffic calming measures. Attachment 1 lists 10 of the most common measures and indicates potential applications in Richmond. The suitability of these devices and their potential applications are discussed below.

4.1 Vertical Deflections

Vertical deflection measures create a vertical motion in the vehicle as it passes over the device. These devices should be used only on local or low-volume streets.

- *Speed Humps* – generally, the City installs speed humps only in laneways due to concerns with the potential impacts on adjacent residences of noise from braking and accelerating and vibrations, which can be more pronounced in Richmond due to its soil conditions. Notwithstanding, speed humps are an effective means of reducing speeds and they may be considered for local streets on a case-by-case basis with consideration to site specific issues, such as topography, and neighbourhood acceptance.
- *Raised Crosswalks* – should only be used where a marked crosswalk is required based on technical warrants. As raised crosswalks have similar impacts as speed humps, this device has not been applied on any city streets but its future application may be considered on a individual project basis.

4.2 Horizontal Deflections

Horizontal deflection measures require a motorist to steer around them. Devices that result in minimal deflection of a vehicle path, such as curb extensions and median islands, can be used on all roads whereas devices that require significant deflection, such as traffic circles and chicanes, should only be used on local streets.

- *Curb Extensions* – can be used on all roads at intersections and at mid-block locations. Lane widths at to the curb extensions range from 3.0-m to 4.3-m.
- *Raised Median Island* – can be used on roads where there is sufficient road width for an island at least 1.5-m wide. Median islands can be used at intersections and at mid-block locations.
- *Traffic Circles* – can be used on local streets and at the intersection of a local street and low volume collector street. Traffic circles should not be used on transit routes or primary emergency response routes. The use of traffic circles on streets without pedestrian facilities or with walkways/sidewalks adjacent to the travel lane should be minimized to avoid having vehicles cross the path of pedestrians when manoeuvring around the traffic circle.
- *Chicane* – one-lane chicanes should be used only on local streets with traffic volumes of at least 1,500 vehicles per day and where traffic volumes in each direction are similar. The effects of a one-lane chicane in deterring short-cutting traffic and slowing vehicles are reduced at lower traffic volumes or more lopsided directional splits.

4.3 Obstructions

Generally, obstructions should be avoided and only used where vertical and horizontal deflection measures will not adequately address an identified traffic problem. Obstructions should only be used on local streets or on low-volume collector streets where there is not a likelihood that traffic will be diverted to other nearby local streets.

- *Directional Closure & Right-in/Right-out Islands* – should only be used on intersections with major streets. At lower volume locations, there is typically not sufficient traffic or on-street activity to deter motorists from circumventing the devices.

- *Raised Median through Intersection* – can be used on all streets but should only be used to block through movements and left turns to and from local streets.
- *Diverter* – should only be used at the intersection of two local streets and should not be used on transit or emergency response routes. The device should be designed to be passable by pedestrians, cyclists and emergency vehicles with minimum delay.

4.4 Existing Local Applications

Over the past 5 years, the City has implemented about 15 traffic calming measures (see table below). These measures include raised median islands, curb extensions, traffic circles and speed humps. These devices have improved local area traffic safety and contributed to the City's 40-50 percent decrease in reported traffic crashes over the past few years.

Street	Year	Traffic Calming Device Installed
Grauer Road	1998	Raised median islands and curbside barriers
Hammersmith Way	1998	Raised median islands and curb extensions
Dyke Road (12,000-block)	1999	Series of speed humps
River Drive	2000	Raised median islands and curbside barriers
General Currie Road	2000	Curb extensions
Jones Road	2001	Curb extensions
Seafair Drive	2001	Traffic circles at Fairfax Cr (south) and Fairbrook Cr
No. 1 Road Lanes	2001	Series of speed humps
Heather Street	2002	Traffic circle at Dayton Avenue and extruded curb
Albion Road	2002	Raised median islands
McNeely Drive	2002	Curb extensions
Minoru Blvd Lanes	2002	Series of speed humps
Moncton Street	2002-03	Curb extensions
Kingfisher Drive	2003	Curb extensions
River Road	2003	Traffic circle at Barnard Drive

5. Traffic Calming Practices in other Jurisdictions

Staff reviewed the traffic calming practices of the following 14 cities in Canada and the U.S. with particular reference to qualification and selection criteria for projects and funding sources.

- Burnaby, BC
- Vancouver, BC
- Surrey, BC
- Saanich, BC
- Calgary, AB
- Asheville, NC
- Lafayette, LA
- Sarasota, FL
- Montgomery, AL
- College Station, TX
- Seattle, WA
- Bellevue, WA
- Portland, OR
- Grand Junction, CO

5.1 Qualification and Prioritization Criteria

Eight of the 14 cities employ a system whereby projects are assigned points across a number of criteria to prioritize projects. Three of these same cities (Portland, Vancouver and Saanich) use a modified version of their points system to first determine if a project qualifies for traffic calming. The remaining cities require that potential projects meet minimum values but do not assign points. The table below summarizes the qualification and selection criteria used.

Criteria	# Cities Using	Q / P	General Basis for Point Assignment
Speed	14	Q/P	85th percentile speed is between 1 and 15 kph higher than the posted speed limit
Traffic Volume	14	Q/P	Range between minimum of 100 to 1,000 vehicles per day
Crash History	7	P	Crashes per year range between minimum of 0.3 to 6
Pedestrian Generators	7	P	Schools, parks, community centres, retail, commercial, institutional uses occur within 500-1,000 feet
Sidewalks	5	P	Street lacks continuous sidewalk on at least one side
Bicycle Routes	4	P	Street is a designated bicycle route
Cut Through Traffic	4	P	Short-cut traffic is minimum of 15-30% of total traffic
Pedestrian Routes	3	P	Street is a safe routes to school or is adjacent to a greenway
Elem School/Crossing	3	P	There is a school zone or marked school crossing present
Residential Density	3	P	Minimum of 10 units per mile or zoned 75% residential
Transit Streets	2	P	Street is a designated bus route
Street Classification	2	Q/P	Local versus collector street / not a designated fire route
Community Support	2	P	% of households supporting action / residents expressed concern
Roadway Geometry	1	P	Presence of potentially hazardous geometry such as horizontal/vertical curvature, street width, proximity of homes to street, stopping/intersection/driveway sight distances and geometry
Street Width	1	Q/P	Not more than 2 lanes wide for speed hump projects
Length of St Segment	1	P	At least 1,000 feet for speed hump projects
Education	1	Q/P	Education program (e.g., Speed Watch) used to no avail
Enforcement	1	Q/P	Enforcement program used to no avail

Note: Q = used as qualification criterion / P = used as prioritization criterion.

As shown in the table, the most commonly used criteria to determine the eligibility and priority of projects are speed, volume, crash history, the presence of facilities that generate pedestrian traffic and the presence or lack of a continuous sidewalk on at least one side of the street.

5.2 Funding Sources

Virtually all cities fund traffic calming projects provided minimum qualification and selection criteria are met. Should the project not qualify for funding or is ranked low in priority, several cities offer property owners the option of funding the project through a Local Improvement Program process. Of the cities reviewed, only Portland does not fund any traffic calming projects – all projects are paid for by property owners or from external grants.

6. Traffic Calming Guidelines

The current City practice generally responds to residents' concerns on a chronological case-by-case basis. However, as the demand for traffic calming now exceeds City resources to complete all of them, there is a need to establish selection and, particularly, prioritization criteria.

The guidelines were developed with reference to fundamental traffic calming principles, Canadian industry standards, current City practices, the best practices of other municipalities, and tailored to local conditions. The guidelines support the following objectives of the City's traffic calming activities, which are derived from the policies and objectives of the City's Official Community Plan and vision and the mandate of the Transportation Department:

- improve liveability by mitigating the negative impacts of vehicle traffic on residential areas;
- provide a safe and appealing environment for residents and motorists, cyclists, pedestrians, and transit passengers;
- promote and support alternative transportation modes to the automobile;
- include public consultation as a key component of the process; and
- manage City resources efficiently.

These Guidelines would be applied to projects that comprise remedial measures for existing roads. Per the City's current practice, the design of new roads may include traffic calming measures to forestall potential future traffic safety concerns.

6.1 Qualification Criteria

The following criteria are proposed to determine if existing traffic conditions on a local or collector street warrant traffic calming measures. A blend of objective and subjective criteria would be used with a minimum of 40 points required (out of 100) for the conditions to warrant further analysis and public consultation. The subjective measures captured by the "Neighbourhood Conditions" criterion include staff's assessment of the potential for property damage and/or injuries as a result of speeding incidents, roadway geometry and the feasibility of implementing traffic calming measures, and the level of cut-through versus local traffic.

Qualification Criteria	Points	Basis of Assignment
Speed	0 to 40	2 points for every kph that the 85th percentile speed is more than the posted speed limit
Volume	0 to 40	1 point for every 50 vehicles per day (ADT/50)
Neighbourhood Conditions	0 to 20	5-point increments assigned at discretion of staff to reflect severity and impact of traffic conditions on neighbourhood
Total Possible	*100*	*Minimum of 40 points required*

Should the conditions not warrant physical changes to the roadway, residents would be provided with information on potential education and enforcement initiatives (e.g., Speed Watch).

6.2 Prioritization Criteria

The table below identifies the proposed criteria to determine the priority of multiple eligible projects. Implementation of any project is subject to funding availability.

Prioritization Criteria	Points	Basis of Assignment
Excessive Speed	0 to 40	2 points for every 1% of vehicles travelling at excessive speeds (i.e., 20 kph over the posted speed limit)
Volume	0 to 40	1 point for every 50 vehicles per day (ADT/50)
Crash History	0 to 15	5 points for every collision in an average year, based on the average number of collisions over the last 3 years
Pedestrian Generators	0 to 15	5 points for each public facility within 500-m (e.g., community centres, schools) that generates a significant number of pedestrians
School/Playground Zone	0 to 10	5 points for each school zone present
Sidewalks	0 or 5	5 points if no continuous sidewalk on at least one side of street
Bike Route	0 or 5	5 points if the street is a designated bike route
Neighbourhood Conditions	0 to 20	5-point increments assigned at discretion of staff to reflect severity and impact of traffic conditions on neighbourhood
Total Possible	*150*	

The criteria are primarily objective measures that would be assigned values based on information collected by staff. Attachment 2 provides a sample score calculation.

6.3 Monitoring Process

Should the proposed Traffic Calming Guidelines be endorsed by Council, staff would implement the Guidelines and monitor the results for a 2-year period. The Guidelines would be assessed on their ability to filter traffic calming requests (e.g., are they too stringent or too lax), equity, efficiency, and ease of application. Staff would report back to Council on the overall impact of the Guidelines on the City's traffic calming process.

Financial Impact

None at this time. Eligible traffic calming projects will continue to be funded from the annual Capital Works Program (Neighbourhood Traffic Safety Program), which is subject to Council approval. Some projects may be eligible for grants from external agencies.

Conclusion

Over the past several years, the City has received an increasing number of requests for various forms of traffic calming measures to address perceived traffic safety concerns. While each request is evaluated based on facts and data derived from traffic studies and site observations, the evaluation process for each request is conducted in relative isolation from other, similar requests and without the benefit of standardized formal guidelines. A set of traffic calming guidelines are therefore proposed to ensure consistency in the analysis and application of traffic calming measures and assign priorities to requests. Staff have reviewed the current literature on traffic calming, practices of other jurisdictions and the City's current practice in the development of these Guidelines. Staff recommend that the proposed Traffic Calming Guidelines be endorsed to improve the current traffic calming procedure and thereby enhance traffic safety, customer service and liveability within Richmond.

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JC:jc

Attachment 1

10 Most Common Traffic Calming Devices

Type	Measure	Description	Benefits	Potential Impacts	Application
Vertical Deflection	Speed Humps	Similar to a parking lot speed bump but 4-m in length	• Lower speed (to 45 kph) • Decreased collisions (by 40-60%) • Reduced volumes (from 5-20 %)	• Delay to emergency vehicles • Increased noise and vibration	• Lane
	Raised Crosswalk	Combines a speed hump with a marked crosswalk	• Lower speed (to 30-35 kph over crosswalk) • Decreased frequency & severity of vehicle-pedestrian conflicts • Improved pedestrian visibility	• Delay to emergency vehicles • Increased noise and vibration	• Lane
Horizontal Deflection	Curb Extension	Extend curb on one or both sides to narrow street	• Reduced crossing distance for pedestrians • Increased pedestrian visibility • Improved sightlines • Lower speed (by about 3 kph)	• May reduce amount of on-street parking • Cyclists may feel "pushed" into vehicle path	• Local • Collector
	Raised Median Island	Centre median to narrow street	• Island provides refuge for pedestrians • Decreased speed (by about 3 kph)	• May reduce amount of on-street parking	• Local • Collector
	Traffic Circle	Raised island in the centre of an intersection	• Fewer collisions (by 50-80%) • Reduced mid-block speeds (to 40-50 kph) • Less volume (from 0-20%)	• Delay to emergency vehicles • May reduce amount of on-street parking • May force vehicles into crosswalk area	• Local • Low-volume Collector
	Chicane	Series of staggered curb extensions on alternating sides of road to reduce width	• Less volume (up to 50%) • Reduced speed (25 kph through and 45-50 kph between chicanes) • Reduced collisions (30%+)	• May reduce amount of on-street parking • May divert traffic to other streets	• Local
Obstruction	Directional Closure	Curb extension or barrier constructed to centreline at intersection to obstruct one direction of traffic	• Less volume (50%+) • May reduce speed (to less than 50 kph) • Reduced crossing distance for pedestrians	• Restricts residential access • May divert traffic to other streets • Motorists may circumvent island	• Local • Low-volume Collector
	Right-in/ Right-out Island	Raised triangular island located on one approach to an intersection	• Less volume (50%+) • Reduced collisions due to reduced left-turn and through movements	• Restricts residential access • May divert traffic to other streets • Motorists may circumvent island	• Local • Low-volume Collector
	Raised Median through Intersection	Centre medians through an intersection	• Less volume (50%+) • Reduced collisions due to reduced left-turn and through movements • Island serves as pedestrian refuge	• Restricts residential access • May divert traffic to other streets	• Local • Low-volume Collector
	Diverter	Barrier placed diagonally across intersection	• Reduced volume (up to 80%) • Reduced collisions due to elimination of conflicting movements	• Restricts residential access • May divert traffic to other streets • Delay to emergency vehicles	• Local • Low-volume Collector

Sample Traffic Calming Score Calculation

1. Raw Data

Local Street: Seafair Drive south of Fairfax Cr
Sample Size: 3,281 vehicle speeds

Average Daily Traffic (ADT) Volume: 469
85th Percentile Speed: 61.17 kph

2. Eligibility Criteria

Criteria	Score
Speed	= assign 2 points for every kph that 85th percentile speed is more than posted speed limit = (61.17-50.00)*2 = 22.34
Volume	= assign 1 point for every 50 vehicles per day (i.e., ADT/50) = 469/50 = 9.38
Neighbourhood Conditions	= assign 5-point increments to reflect severity and impact of traffic conditions (0=no impact; 20=high impact) = 10
Total	= **41.72 > 40**

Project meets eligibility criteria of a minimum of 40 points. Therefore, proceed to the prioritization stage.

3. Prioritization Criteria

Criteria	Score
Excess Speed	= assign 2 points for every 1% of vehicles travelling 20 kph over the posted speed limit = [% travelling > (50 + 20 kph)]*2 = (4.32 %)*2 = 8.64
Volume	= assign 1 point for every 50 vehicles per day (i.e., ADT/50) = 469/50 = 9.38
Crash History	= 5 points for every collision in an average year, based on last 3 years = 0
Ped Generators	= 5 points for each public facility within 500-m = 0
School Zone	= 5 points for each school zone present = 0
Sidewalks	= 5 points if no continuous sidewalk on at least one side of street = 0
Bike Route	= 5 points if the street is a designated bike route = 0
Neighbourhood Conditions	= assign 5-point increments to reflect severity and impact of traffic conditions (0=no impact; 20=high impact) = 10
Total	= **28.02**

Given that the total number of points possible from the Prioritization Criteria is 150, this project's score of 28.02 would likely rank it low in priority relative to other projects. Its relatively low score reflects the availability of pedestrian facilities (sidewalks) and a lack of pedestrian generators. Potential projects that include school zones and lack sidewalks would rank relatively higher, which logically reflects the greater exposure of pedestrians to existing traffic conditions.