THE CORPORATION OF THE CITY OF WINDSOR
POLICY

Service Area:	**Office of the City Engineer**	Policy No.:	
Department:	**Transportation**	Approval Date:	**January 12, 2026**
Division:	Infrastructure Services	Approved By:	**CR11/2026**
		Effective Date:	**January 12, 2026**
Subject:	**Traffic Calming Policy**	Procedure Ref.:	- Traffic Calming Program
Review Date:		*Pages:*	Replaces: Traffic Calming Policy
Prepared By:	A. Italiano, Road Safety Coordinator	2	Date: May 9, 2022

1. POLICY

1.1. This policy governs the implementation of traffic calming for the Corporation of the City of Windsor.

2. PURPOSE

2.1. The purpose of this policy is to provide Administration and the general public with a simple and transparent framework to assess, design and implement traffic calming measures on primarily residential streets to reduce and maintain appropriate traffic speeds and volumes.

3. SCOPE

3.1. This policy covers all traffic calming related service requests for existing and new streets maintained by the city
3.2. This policy should be utilized in coordination with the City's Active Transportation Master Plan and School Neighbourhood Policy, where applicable.
3.3. This policy will be utilized for local and collector streets. Arterial streets will only use passive measures listed in the Traffic Calming Program.

4. RESPONSIBILITY

4.1 Council has authority to approve implementation and funding for traffic calming plans that are developed under this policy, and is responsible for approving amendments to this policy.
4.2 Administration is responsible for carrying out this policy as follows:
- **4.2.1** The City Engineer or their designate are corporate leads for all transportation and associated public safety programs and are responsible for initiating amendments to the Traffic Calming Program.
- **4.2.2** The Senior Manager of Transportation is responsible for:
  - **4.2.2.1** Overseeing implementation of this policy,
  - **4.2.2.2** Bringing forward traffic calming plans before Council for approval,
  - **4.2.2.3** Recommending operating and capital budget expenditures related to traffic calming, and

4.2.2.4 Recommending amendments to this policy to Council.

4.2.3 The Manager of the 311 Call Centre has overall responsibility for receiving public poll responses, and for reporting these responses to the Senior Manager of Transportation.

5. GOVERNING RULES AND REGULATIONS

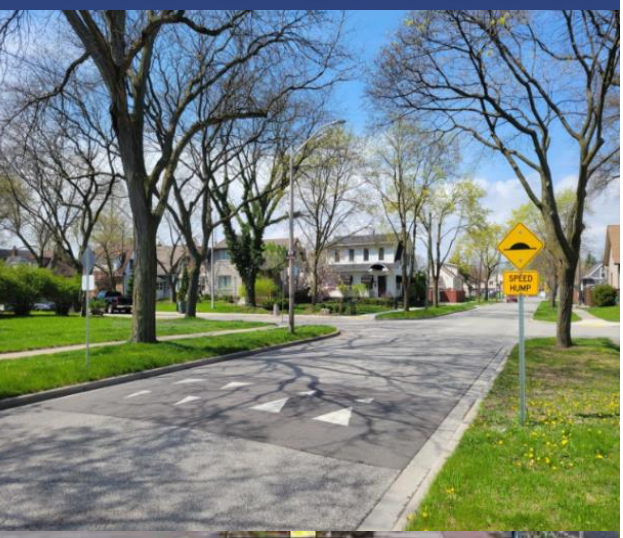
5.1 This policy will be implemented in accordance with Attachment 1.

6. RECORDS, FORMS AND ATTACHMENTS

6.1. Records for this policy shall be prepared and retained in accordance with Records Retention By-Law 21-2013, as amended.

6.2. Attachments:

6.2.1. Attachment 1: Traffic Calming Program



THE CITY OF WINDSOR
ONTARIO, CANADA

TRAFFIC CALMING PROGRAM

Transportation Division
Public Works
Office of Commissioner of Infrastructure Services

Acknowledgments

The source of some of the reference material contained in this manual was retrieved from the following:

- Canadian Guide to Traffic Calming (Second Edition) – Transportation Association of Canada (TAC)
- Ontario Traffic Manual Book 15 – Pedestrian Crossing Treatments
- City of London, ON, Canada
- City of Chatham Kent, ON, Canada
- City of Hamilton, ON, Canada
- City of Guelph, ON, Canada
- City of Oakville, ON, Canada
- City of Burlington, ON, Canada
- City of Vaughan, ON, Canada
- City of Markham, ON, Canada

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INTRODUCTION

BACKGROUND

Under the Ontario Municipal Act, the City of Windsor (City) is required to build and maintain a safe and efficient road system for all road users such as cars, cyclists, pedestrians (including those with accessibility needs), transit, emergency vehicles, and snow removal equipment. When residents do not feel safe while driving a vehicle, riding a bike, or walking on the street, they forward their safety concerns to the City. In these cases, traffic calming measures may be required to mitigate those safety concerns.

Every year, the City receives multiple safety concerns related to speed, traffic volumes, and/or cut through traffic in residential areas. The City staff responds by reviewing the safety concern to determine if neighbourhood traffic calming measures are warranted to help alleviate the existing issues.

This document defines what traffic calming is and clarifies what traffic calming is not. This document also outlines how the traffic calming service requests should be initiated, reviewed, and implemented based on the experience gained by the City of Windsor and the other nearby municipalities. The goal of introducing traffic calming is to:

- Create safe streets that promote walking, cycling and transit use,
- Improve the quality of life in residential neighbourhoods,
- Positively change the public's behaviour,
- Support the Vision Zero Policy

VISION ZERO

Vision Zero is a philosophy that encourages changes in the way roads work to ensure all fatalities and life-altering injuries caused by auto collisions are eliminated. Its main goal is to make the road network safer, healthier, and equitable for all users, regardless of one's mode of travel, level of mobility, and other factors. The Vision Zero approach is as follows:

- Traffic deaths are preventable
- Humans make mistakes
- We must prevent fatal and severe injuries
- Road safety requires a systems approach
- Saving lives is not expensive

Traffic calming measures may assist in addressing driver behaviour which is one of the main strategic priorities outlined in the Vision Zero Policy.

Introducing traffic calming measures near schools should improve safety for all road users and thus respond to Vision Zero principles. By addressing some of the safety concerns that parents and caregivers have with respect to students walking/cycling to school, safety routes to and from school can be created, encouraging a more active lifestyle for students. Traffic calming measures in School Zones are not subject to the traffic calming process identified in this document. The City can install traffic calming measures in School Zones without the petition and survey requirements identified in this document.

TRAFFIC CALMING PURPOSE & GOALS

According to the Canadian Guide to Neighbourhood Traffic Calming, prepared by the Institute of Transportation Engineers (ITE) and the Canadian Guide to Traffic Calming – Transportation Association of Canada (TAC) February 2018:
"The purpose of traffic calming is to restore streets to their intended function."

Traffic calming is intended to improve the enjoyment and pedestrian friendliness of the neighbourhood under review by reducing traffic speed and volume on a group of streets within a specific geographical area and by implementing proven methods to reduce identified problems. This Traffic Calming Program provides a framework that will enable City administration to determine proper and effective courses of action when dealing with concerns relating to traffic volume, excessive speed, and pedestrian, cyclist, and vehicular safety.

The main goals of the Traffic Calming Program guidance document are to:

- Educate residents about traffic calming so they can make more informed decisions and understand the rationale behind the City's decision-making process
- Provide a procedure that City officials and the public are confident is an effective and fair tool in evaluating traffic speeding and/or volume issues
- Provide a standard format that is efficient in addressing all different types of traffic safety concerns
- Encourage public participation in the traffic calming process

This program will also provide the guideline, procedure and criteria for the initiation, review, and implementation of traffic calming measures within existing and new residential neighbourhoods. The procedures will ensure safety concerns related to speeding and excessive volume are handled in a fair, transparent and efficient manner.

WHAT IS NOT TRAFFIC CALMING

<u>Unwarranted All-Way Stop Signs</u>

- Results in higher speeds between stop signs
- Results in poor compliance with stop signs due to driver frustration
- Results in more frequent rear-end collisions caused by low percentage of motorists who perform a complete stop
- Requires frequent police enforcement as some motorists' compliance is low, which creates a pressure on enforcement resources and is ineffective in the long term

- Increases potential risk to pedestrians especially children and seniors crossing the intersection, since not all motorists approaching an intersection will stop
- Inconsistent application of all way stops can create confusion, unexpected maneuvers and collisions

All-way stop signs should not be used as a tool to calm traffic. The City of Windsor currently uses an all-way stop warrant checklist which considers the numbers of pedestrians and vehicles sharing an intersection, the collision history and visibility of the intersection. When these criteria are evaluated, risks are minimized, and new safety concerns are not created.

<u>'Children at Play' Sign</u>

- 'Children at Play' signs can give parents a false sense of security since motorists often disregard these signs
- Children playing in the streets, while common place, is not condoned and is prohibited in the Highway Traffic Act and the City of Windsor's Traffic By-law
- Since children live on nearly every residential block, 'Children at Play' signs would need to be placed on every roadway
- Residential blocks with no signs might imply that no children live there, so it is acceptable to exceed the speed limit.

ADVANTAGES & DISADVANTAGES OF TRAFFIC CALMING

<u>Advantages</u>

- Reduced vehicle speeds
- Reduced traffic volumes
- Reduced number of cut through vehicles
- Improved neighborhood safety, especially for pedestrians and cyclists
- Reduced conflicts between roadway users
- Increase compliance with regulatory signs

<u>Disadvantages</u>

- May make it more difficult to get into and out of a neighbourhood every day
- Increase in emergency vehicle response time, although all traffic calming
- plans are reviewed by emergency services
- May result in expensive solutions (time and resources) to develop, implement, and maintain
- May shift or divert traffic onto other neighbouring streets
- Increased maintenance time and costs
- Adds sign pollution to residential areas

PEDESTRIANS & TRAFFIC CALMING

The principal purpose to reducing the speed of traffic in residential areas is to protect all vulnerable road users, such as pedestrians. Copied below is an excerpt from the Ontario Traffic Manual Book 15 - Pedestrian Crossing Treatments:

Pedestrians' Rights and Responsibilities
Notwithstanding the distinction between controlled and uncontrolled crossings, the rights and responsibilities for pedestrians are recognized in the Highway Traffic Act:

1. In the absence of statutory provisions or bylaw, a pedestrian is not confined to a street crossing or intersection and is entitled to cross at any point, although greater care may then be required of him or her in crossing. However, pedestrians crossing the highway must look to ensure the crossing can be made safely or possibly be held responsible for any ensuing collision.

2. Pedestrians must exercise due care even when they are lawfully within a crossing and have right-of-way. It is not an absolute right and they must still exercise care to avoid a collision with a vehicle.

3. If there is a crosswalk at a signalized intersection, pedestrians have to walk within the crosswalk

The above excerpt is stating whenever a pedestrian crosses a road, they have a duty of care to themselves to cross when it is safe. It is important to remember under the Highway Traffic Act motor vehicles are only required to stop or yield to pedestrians at a controlled crossing such as traffic signals or pedestrian signals. At all uncontrolled crossings pedestrians must wait for a safe gap in traffic sufficient for them to cross
before entering the road.

When an area is studied for traffic calming, pedestrian crossing points are primary focus points where slowing traffic is particularly important. The installation of traffic calming measures such as speed cushions, raised crosswalks, raised intersections, or curb extensions do not change the rules of the Highway Traffic Act: however, pedestrians must still cross the road responsibly.



TYPES OF TRAFFIC CALMING

Traffic calming for the purpose of this program is broken into two categories:

- Passive Traffic Calming
- Physical Traffic Calming

PASSIVE TRAFFIC CALMING

Passive traffic calming are treatments that do not modify the geometry of the road such as education, targeted speed enforcement, radar speed feedback signs, pavement markings, on-street parking, and signage. They are simple modifications that are intended to increase driver awareness to speeding behaviour, visually reduce effective lane widths for a motorist and, in most circumstances, re-allocate some of the road space to cyclists and on-street parking

Passive treatments are implemented on a proactive and reactive basis and are typically applied uniformly over the entire road section, unlike physical treatments which are best described as spot treatments. The modifications associated with passive calming treatments are typically well received by the public. City staff will provide the public with advance notification, including a plan of the proposed modifications prior to implementation.

PHYSICAL TRAFFIC CALMING

Physical traffic calming are intrusive treatments that modify the shape and/or form of the roadway forcing drivers to slow down. They can be broken down into three categories: vertical deflections, horizontal deflections and physical obstructions.

Vertical traffic calming provides an obstruction that vehicles can travel over. The change in pavement height (and sometimes pavement materials) can cause discomfort to the occupants of vehicles that are exceeding the design speed of the traffic calming measure.

Horizontal traffic calming work by preventing vehicles from traveling in a straight line at excessive speeds by using measures such as raised islands and curb extensions.

Physical obstructions involve a full or partial closure of the road.

Examples of passive and physical traffic calming are listed in **Table 1** below**.** The list provided in Table 1 is not exhaustive. City staff retain the discretion to pilot traffic calming measures not included herein,

subject to the approval of the City Engineer. More details related to passive and physical traffic calming are found in the **Types of Traffic Calming Measures** section of this document**.**

Table 1 - Applicability of Traffic Calming Measures based on Road Classification and Route

Traffic Calming Measure	Road Classifications			Transit Route
	Local	Class II Collector	Class I Collector	
Passive Measures				
Education	Yes	Yes	Yes	Yes
Road Watch Program	Yes	Yes	Yes	Yes
Targeted Enforcement	Yes	Yes	Yes	Yes
Radar Speed Feedback Signs	Yes	Yes	Yes	Yes
Vehicle Activated Warning Signs	Yes	Yes	Yes	Yes
Pavement Markings	Yes	Yes	Yes	Yes
On-Road Sign Pavement Markings	Yes	Yes	Yes	Yes
On-Street Parking	Yes	Yes	Yes	Yes
Road Diet	Yes	Yes	Yes	Yes
Physical Vertical Traffic Calming				
Speed Hump	Yes	No	No	No
Textured Crosswalk	Yes	Yes	Yes	Yes
Raised Crosswalk	Yes	Yes	Yes	Yes
Raised Intersection	Yes	Yes	Yes	Maybe
Transverse Rumble Strips	Maybe	Maybe	Maybe	No
Physical Horizontal Traffic Calming				
Curb Radius Reduction	Yes	Yes	Yes	No
Lane Narrowing	Yes	Yes	Yes	No
Flexible Posts/Edge Bollard	Yes	Yes	Yes	Maybe
Traffic Calming Curb	Yes	Yes	Yes	Yes
Raised Median Island	Yes	Yes	Yes	Yes
Sidewalk/Curb Extension	Yes	Yes	Yes	Yes
Traffic Circle/Roundabout	No	Yes	Yes	Yes
Right-in/Right-out Island	Yes	Yes	Yes	No
Chicanes	Yes	No	No	No
Physical Obstruction				
Directional (Half) Closure	Yes	No	No	No
Full Closure[1]	Yes	No	No	No
Diagonal Diverter	Yes	No	No	No
Raised Median Through Intersection	Yes	Yes	Yes	No
Turn Prohibition Sign[2]	Yes	Yes	No	No
Through Prohibition Sign[2]	Yes	Yes	No	No
Traffic Calming Neighbourhood Sign[2]	Yes	Yes	Yes	Yes

Note 1: The City's ATMP recommends the City strive to ensure that traffic calming does not encourage dead end streets to preserve connectivity for pedestrians.
Note 2: Only used in conjunction with physical measures.

TEMPORARY TRAFFIC CALMING

Temporary traffic calming measures are safety measures that can be implemented and removed rapidly with minimum civil work. The Traffic Calming Program now only permits the implementation of temporary traffic calming measures if deemed warranted following a review.

STREETS THAT QUALIFY FOR TRAFFIC CALMING

Traffic calming will be considered for local, collector and arterial roads.

Local and Collector Streets:

A primary function of local streets is to provide access to adjacent properties. These streets are not intended for use as through routes or as corridors to move traffic within the overall road network. For collector streets, access to adjacent properties is balanced by a need to collect and distribute traffic travelling into and out of an area or neighbourhood. As with local streets, collector streets are generally not intended to be through routes or to move significant amounts of traffic from one part of the road network to another.

On local and collector streets, traffic calming is intended to achieve one or more of the following objectives: reduce vehicular speeds, discourage cut through, minimize conflicts between street users and improve the neighbourhood environment.

Arterial Roads:

Traffic calming for arterial roads requires a different approach than for local and collector streets. The primary purpose of traffic calming on these roads is to reduce excessive vehicle speeds, alleviate conflicts between road users, and eliminate inappropriate driver behaviour. Measures that restrict or divert traffic or introduce significant vertical deflections into the street are inconsistent with the typical role and function of the arterial roads and should not be implemented.

Speed management is a more significant challenge on arterial roads, especially through rural settlements where the main roadway through the town serves a dual role. Outside the town, the roadway provides high-speed travel over long distances. Within the built-up area, the same roadway may transition to accommodate local access, pedestrians of all ages and abilities, on street parking, bicycles, and the many other features unique to the character of a community. The type of road user also varies more in the rural area, ranging from commuter traffic, heavy vehicles (agricultural equipment and trucks) and other users to local motorists, pedestrians and cyclists. The adjacent road environment – wide-open spaces, long periods of uninterrupted traffic flow, roads designed for higher operating speeds – is not always conducive to encouraging driver behaviour compatible with an urban setting upon arrival at the town limits.

BIKEWAYS TRAFFIC CALMING

Administration will review the City's cycling network on an on-going basis to identify streets that may be classified as a local street bikeway to develop the All Ages and Abilities (AAA) network recommended in the Active Transportation Master Plan (ATMP).

Local street bikeways are streets with low traffic speeds and volumes that have been optimized for cyclists and those driving vehicles to share the roadway for travel through treatments such as traffic calming and traffic reduction by means of signage and pavement markings, as well as intersection crossing treatments, to allow through movements for cyclists while discouraging similar through trips by non-local motorized traffic (Ontario Traffic Manual (OTM) Book 18 - Cycling Facilities).

Administration may consider implementing permanent traffic calming on streets that are local street bikeways according to the OTM Book 18 selection guidelines. OTM Book 18 mentions that the appropriate motor vehicle speed and average daily vehicle traffic for a local street bikeway should be 40km/h or less, and less than 3,000 average daily vehicle traffic. Administration will assess the streets that are identified as a local street bikeway using the following methods:

- If the 85th percentile speed is found to be 50km/h or more, then traffic calming measures should be considered to lower the speed to reach the appropriate motor vehicle speed limit for a local street bikeway,
- If the average daily traffic is found to be 3,000 or more, then traffic calming measures should be considered to reduce the traffic volumes to reach the appropriate traffic volumes for a local street bikeway.

Local street bikeway projects will not require a petition or warrant review to implement traffic calming measures if they are ATMP-identified bikeway development projects.

Other measures may also be considered at critical locations where local bikeways intersect with major roads or other bikeways to minimize conflicts between motor vehicles and cyclists or pedestrians. Examples of crossing treatments include median islands, pedestrian corridors, signals and sensors. Administration will continue to explore new traffic calming measures and may test different measures as pilot projects to determine if they are suitable for temporary or permanent installation.

Applicable policies, guidelines and master plans should be considered during the review, including the City's Active Transportation Master Plan, School Neighbourhood Policy, the Canadian Guide to Traffic Calming – TAC and the Ontario Traffic Manual Book 18 - Cycling Facilities. The construction of traffic calming measures shall meet the requirements on the City of Windsor Development Manual and any relevant City of Windsor Engineering Standard Drawings.

Other affected agencies, such as Transit Windsor, Emergency Services, the Windsor Accessibility Advisory Committee (WAAC), the Active Transportation Expert Panel, the local School Board Transportation service provider, any affected Business Improvement Areas (BIA) and the Windsor-Essex County Health Unit (WECHU) may be invited to provide comments and feedback.

Projects will be proposed based on the prioritization criteria provided in the Active Transportation Master Plan. The number of projects proposed in any given year will depend on associated implementation cost and available budget. The length of time a project has been waiting for implementation funding will not

influence whether it is constructed in the coming season. Practical considerations may affect the selection of projects, some of which include the availability of funds restricted to specific activities or areas, and the potential to coordinate with other projects and the availability of alternate funding sources. Administration will present a report to Council for approval to fund and implement the Traffic Calming Plan. Other methods for presenting the results to Council may include an annual presentation as a part of the capital budgeting process.

Administration will notify the public when a Traffic Calming Plan is to be presented to Council for approval. Notification may be provided by any of the following means:

- A notice provided to adjacent households and commercial properties; or
- A notice posted at the location of the concern; or
- Information posted on the City's website, local newspaper or other media.

Opportunities to include traffic calming measures on residential streets with designated bikeways should be considered prior to road reconstruction projects.

The City's Active Transportation Master Plan encourages pedestrian connectivity for pedestrians and cyclists when considering dead-end streets as a traffic calming measure.

NEW NEIGHBOURHOOD TRAFFIC CALMING

Traffic Calming will be considered in all new neighbourhoods and placed based on the road classification in the City's Official Plan for the area. The designation of those streets will dictate the type of traffic calming devices that are to be implemented. Developers will be required to include engineering design plans for approved traffic calming devices in plans of subdivisions and new development. Traffic calming measures such as traffic circles, roundabouts, chicanes, sidewalk/curb extensions, lane narrowing, raised median islands, and raised median through intersections, are considered for new neighbourhoods.

The design and proposed location of traffic calming measures are required to be included in the application for a plan of subdivision or new development. Each measure location shall include the following elements:

- Traffic calming measures should meet the design criteria and all required signage and markings according to the latest version of the Canadian Guide to Traffic Calming – TAC,
- Traffic calming devices must permit and allow for the potential enhancement of safe movements by all non-motorized modes of travel,
- The design should consider requirements outlined in the City's Active Transportation Master Plan and School Neighbourhood Policy.

Proposed design drawings will be circulated to other City departments for review.

PROCEDURE GUIDELINES

The following guidelines should be taken into consideration when investigating, selecting and implementing techniques suitable for local conditions. Applying them will maximize the effectiveness of the traffic calming process, and will help to build community acceptance and support for the proposed solution:

- **Identifying and agreeing upon the actual conditions**. It is not uncommon that the perceived nature of a traffic problem is substantially different from the real situation. In some cases, the difference is so great that a solution intended to eliminate the perceived problem might create a real problem that didn't exist before. For example, residents often mention "traffic volume" and "speeding" as concerns on their streets, but in some cases, the data shows there is no issue, or the problem is the opposite of the one stated. If the real problem is speeding, a measure which significantly reduces the traffic volume on a street might inadvertently encourage speeding if fewer cars remain on the street to slow traffic. It is therefore important to identify the real conditions. This will aid in selecting the appropriate measure and/or helping to prioritize the preferred technique(s), if it is determined that there is a situation that needs to be addressed.
- **Quantifying the problem**. Some problems are more significant than others. Some are all-day problems, whereas others occur only at certain times of the day, or only in one direction. To select appropriate traffic calming measures, it is important to quantify the extent of the problem. This usually means gathering data, which can include obtaining or conducting traffic and vehicle classification counts, speed studies, licence plate traces, parking surveys, and collision statistics. Quantifying also aids the residents in understanding the nature and magnitude of the real problem.
- **Considering the source of the problem**. Congestion on the arterial road system is the most common reason why motorists shortcut through a neighbourhood. If there is a cut through problem, opportunities to improve the operational efficiency of the network through low-cost measures such as traffic signal retiming, turn prohibitions and parking restrictions, may be considered before developing a traffic calming program directly on the residential street. Care should be exercised to avoid creating a speed management issue on the arterial road because of the operational changes.
- **Considering enforcement and education first**. Enforcement and education techniques require no physical changes, are potentially less expensive and are usually faster to implement. While education and enforcement programs tend to be local and specific in nature and therefore not well documented, examples of some education programs are described in the National Highway Traffic Safety Administration's report titled *"Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices"*. Consideration should be given to enforcement and/or education programs, either stand-alone, or as a first step as part of an integrated solution. While police enforcement is not a viable long-term approach, some limited initial manned enforcement with occasional follow-up visits may be enough to manage the situation.

- **Applying traffic calming measures on an area-wide basis, not on a localized, site by site basis**. In considering measures to resolve a speeding, cut through and/or other driver behaviour problem in one location, any potential effects on adjacent streets must be considered. These effects might include traffic diverted to other streets, motorists who speed up after passing a traffic calming measure, or changes in turning movements that increase delay at another intersection. If these local area effects are not considered in advance, a traffic calming solution might simply create or exacerbate problems elsewhere in the community.
- **Avoiding restricting access and egress**. Generally, residents, transit operators, emergency service providers and other members of the community will be more supportive of traffic calming measures that do not unduly restrict access into and out of their area. Diverters, barriers and closures can limit entry for people who live or work on a street, and often there are as many residents opposed to these types of measures as those in support. Measures which restrict access might also divert traffic to other streets, creating or exacerbating problems elsewhere in the neighbourhood.
- **Using self-enforcing measures**. Generally, measures that maintain a 24-hour presence and do not require police enforcement to be effective, are preferable. For example, consider using speed humps instead of speed limits, semi barriers (i.e., egress only) and diverters instead of turn prohibition signs, and traffic circles or roundabouts instead of all-way stop signs to minimize the need for police enforcement. Measures that can be circumvented, such as turn prohibitions or partial closures, are best used at intersections with major streets, where visibility and the presence of other traffic may discourage motorists from disobeying or ignoring these measures. The effectiveness of all physical traffic calming measures can generally be enhanced through quality landscaping of the measure, where appropriate. Usually, horizontal and vertical presence of a landscaped measure increases drivers' awareness of their immediate environment, which can result in increased safety, assuming visibility is not impaired.
- **Not impeding non-motorized modes**. The purpose of traffic calming is to reduce the negative effects of motor vehicles while improving conditions for other travel modes. Consequently, traffic calming measures should be designed to permit cyclists and pedestrians to safely and efficiently travel along and crossroads. Techniques to accommodate non-motorized modes should include elements such as gaps in barriers for bicycles or median refuges for pedestrians crossing streets.
- **Considering all services**. Input shall be obtained early in the process from all service providers, including Transit, Police, Fire, ambulance and other emergency services, as well as garbage collection, snow plowing and street cleaning. These collaborators should be actively involved in the planning and design of the traffic calming plan. Doing so will help to minimize delays and impacts to these critical public services and will address a common concern often raised by persons objecting to traffic calming measures.
- **Monitoring and follow-up**. It is important to report back to the community and decision-making bodies about the degree of success of implemented traffic calming measures. This helps to justify expenditures and enhances the credibility of traffic calming efforts. It may also be useful to implement measures on a temporary trial basis for one year to monitor their effect, and to prepare contingency plans in case the measure does not produce desired results or receives adverse community reaction. Removal of ineffective or outdated measures should also be considered. Therefore, depending on the measure or plan being evaluated and the problem being addressed, there is a need to collect comparable traffic volume, speed and collision data before and after implementation.



TRAFFIC CALMING PROCEDURE

A traffic calming project is initiated when a resident, business or group submits a concern specifically related to vehicle speeds and/or volumes. Requests are submitted by contacting 311.

There are five stages of a traffic calming project:

Stage 1: Project Initiation

Stage 2: Project Development

Stage 3: Project Approval

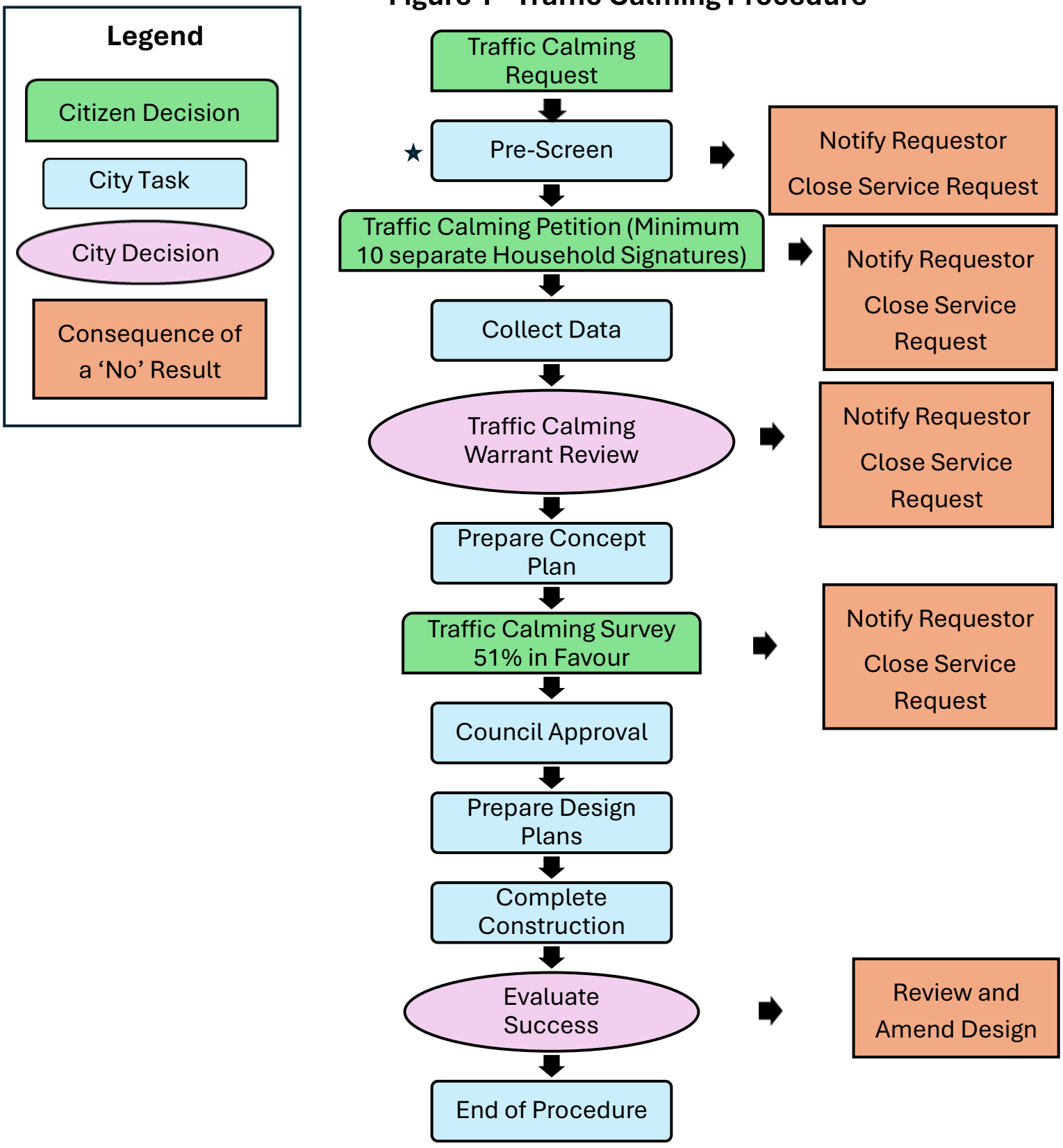
Stage 4: Project Implementation

Stage 5: Project Evaluation

A traffic calming project ends when the traffic calming project implemented is a success.

The following traffic calming procedure will be used when a traffic calming service request is received as shown in **Figure 1**.

Figure 1 - Traffic Calming Procedure



★ Arterial roads that pass the pre-screening will not require a petition or warrant review to implement passive measures.

STAGE 1: PROJECT INITIATION

PRE-SCREENING

Upon receiving the request, Administration will conduct a pre-screening using cloud base data. During the pre-screening the street is evaluated for eligibility and must meet all the following criteria, otherwise the review process ends:

- Local, Collector, or Arterial road in the City's Official Plan
- Longer than 300 metres
- Has not been evaluated for traffic calming in the last 3 years
- Speed Limit of 50km/h or lower (only applies to local and collectors)
- Residential property that are fronting the street
- Average daily traffic volume is estimated to be more than 500 vehicles per day
- A minimum 85th percentile speed of 10km/h over the speed limit

Administration will pre-screen the location of concern within the stop control to stop control limits.

For locations not meeting the above initial screening, City staff may assess passive measures to address traffic concerns.

Arterial roads that pass the pre-screening will not require a petition or warrant review to implement passive measures. Evaluation and implementation of passive measures for arterial roads will be based on engineering judgement.

It should be noted that School Zones are exempt from the traffic calming process identified in this document and automatically qualify for traffic calming. Where schools have a speed limit of 40 km/h, traffic calming plans may be prepared and residents of the street will be notified of the implementation plan.

TRAFFIC CALMING PETITION

To move forward with the evaluation, a petition with a minimum of 10 signatures with names and addresses from separate households with direct frontage on the street of concern must be submitted to the City of Windsor within 30 days of the petition being sent. The petition must include the location, the nature of the problem, the time of day which the problems are most significant, as well as any suspected contributing factors. The name, address, and contact information are required from the petition organizer, so that City staff can follow up on the request.

A successful traffic calming petition confirms that there is some neighbourhood support for the initiative. If a petition is not successful, the traffic calming process ends.

The City’s traffic calming program is intended to address long-term speeding issues. Therefore, traffic calming is not implemented where there is ongoing development and changing traffic patterns. Residents should only contact the City to request initiation of the evaluation process if traffic concerns persist once traffic patterns have had the opportunity to stabilize.

DATA COLLECTION

Once the traffic calming petition is successful, the data collection commences. The collection of data is to evaluate whether there is traffic problems present within the location of concern. The data collection may include any of the following:

- Vehicle volume count to determine average daily vehicle volume
- Speed study to determine existing speed data
- Collision data within the last 3 years
- Study to quantify cut through traffic, if necessary
- Routes for trucks, transit, and emergency services
- Existing roadway conditions (e.g. pavement condition, signing, marking)
- Presence of sidewalks on one or both sides of the road
- Presence of special pedestrian generators such as school, playground, community centre, senior homes, libraries, retail etc. abutting the street of concern
- History of traffic operations for the area within the last 5 years

TRAFFIC CALMING WARRANT REVIEW

Once the data collection is complete, City staff conducts a traffic calming warrant review the points criteria identified in **Table 2.** The speed study uses the 85th percentile speed data. Vehicle volume count uses the measured average daily traffic (ADT) counts.

Table 2: Traffic Calming Warrant Review

Traffic Calming Warrant Review				
Location:			**Date Reviewed:**	
Roadway Type:		☐ **Collector Road**	☐ **Local Road**	
Traffic Data				
	Feature	**Range**	**Criteria**	**Score**
1a	Speed	0 to 35	5 points for every 2 km/h that the 85th percentile speed is greater than 10 km/h over the speed limit.	
1b	High Speed	0 to 5	5 points if minimum of 5% of daily traffic exceeds speed limit by 15-20 km/h.	
2	Volume	0 to 20	Local Roads: 5 points for every 1,500 ADT Collector Roads: 5 points for every 2,000 ADT	
3	Short-Cutting Traffic	0 to 15	5 points if there is a presence of 25% or more short-cutting traffic. Additional 5 points for every 10% increment above 25%.	
4	*Collisions	0 to 10	1 point for every reducible collision/year over a 3 year period and 5 points for every collision involving a vulnerable road user within a 3 year period.	
Road Characteristics				
	Feature	**Range**	**Criteria**	**Score**
5	Sidewalks	0 to 10	10 points for no sidewalks with evidence of pedestrian activity, 5 points if the road does not have a continuous sidewalk on at least one side	
6	Pedestrian Generators	0 to 15	5 points for each nearby pedestrian generator such as a school, playground, community centre, libraries, retail centres, etc.	
Total				
Local Road = minimum 35 points				
Collector Road = minimum 52 points				
Does the location meet the minimum requirements?				

* A vulnerable road user is an individual who is at a higher risk of injury or death in a collision with a motor vehicle. This includes pedestrians, cyclists, and individuals with mobility devices.

The collision data used for the criteria should be limited to those collision types which may have been prevented by traffic calming treatments. Excluding the collisions which may not have been prevented ensures that the project does not receive a higher priority for an outlying safety issue beyond the scope of traffic calming. High collision rate areas should be given broader consideration and reviewed outside of

the Traffic Calming Program. In addition to collisions with vulnerable road users, engineering judgement must be used to identify collisions which may be reduced based on suitable traffic calming measures. Both mid- block and intersection collisions may be considered if they meet the above criteria. To ensure that longer streets do not receive a higher priority versus a shorter street because of the higher likely number of collisions due to length, a collision rate is utilized. The collision rate is expressed as the number of collisions per kilometre of roadway.

A project should score at least 35 points in the warrant evaluation if they are local road and 52 points if they are a collector road. Prioritization will be based on points from the warrant evaluation. Additional factors may include other project schedules, available funding and other considerations.

Should a location fail to meet these requirements, residents will be notified in writing and the investigation for traffic calming measures will discontinue. However, City staff may continue to address the concerns of the residents by means of possible passive measures.

STAGE 2: PROJECT DEVELOPMENT

TRAFFIC CALMING CONCEPT PLAN

When reviewing a street, Administration will typically define a study area from stop control to stop control. Some elements of professional judgment will be required in finalizing the limits. If cut through traffic is confirmed as an issue, the study area should consider potential alternative routes cut through traffic would take if measures were implemented.

Cut through traffic may be confirmed by estimating the number of trips made by residential and other types of units along the road. If the measured traffic volume is greater than the estimated volume, cut through traffic may be assumed.

The data collected combined with site visits, historical information, future maintenance and construction plans will be taken into consideration to determine potential traffic calming measures.

The appropriate traffic calming measures will be determined based on **Table 1. Table 1** provides general recommendations for traffic calming measures according to road classification and transit route. The traffic calming plan could include different types of traffic calming measure(s).

Applicable policies, guidelines and master plans should be considered during the review, including the City's Active Transportation Master Plan, School Neighbourhood Policy and the Canadian Guide to Traffic Calming – TAC. Any traffic calming construction work shall meet the requirements on the City of Windsor Development Manual and any relevant City of Windsor Engineering Standard Drawings.

The proposed traffic calming plan should include:

- Description of all aspects of the project
- Description of the problem including results of data collection
- Proposed design layout with signage
- Description/photos of proposed treatment with cost estimate.

STAGE 3: PROJECT APPROVAL

TRAFFIC CALMING SURVEY

Once the concept design is complete the City will mail a letter to all dwelling units and commercial properties within the study area to disclose the final details of the proposed Traffic Calming Plan and request participation in a telephone survey using the City's 311 system (or other means appropriate) to identify community acceptance. A minimum of 51% approval rate is required to indicate support for the Traffic Calming Plan. Administration will interpret non-responses as support. If the threshold is met, the Traffic Calming Plan will be deemed to have been approved by the community in the study area. If this threshold is not met, the project ends and a notification of failure to meet the community support levels will be sent to the residents on the mailing list. However, City staff may continue to address the concerns of the residents by means of possible passive measures.

Approved Traffic Calming Plans will be prioritized using the points score outlined above, with consideration to implementation cost. Projects will be proposed in priority sequence for approval to proceed with implementation. The number of projects proposed in any given year will depend on associated implementation cost and available budget. The length of time a project has been waiting for implementation funding will not influence whether it is constructed in the coming season. Practical considerations may affect the selection of projects, some of which include the availability of funds restricted to specific activities or areas, the potential to coordinate with other projects and the availability of alternate funding sources. Although a project may be appropriate for traffic calming, it may take several years before it proceeds to implementation. The City's traffic calming website provides details about traffic calming projects and status.

COUNCIL APPROVAL

Administration will present a report to the Environment, Transportation and Public Safety Standing Committee containing the Traffic Calming Plan and the results of the prioritization process (including details of costs and public support) for consideration and recommendation to Council about implementation and funding the Traffic Calming Plan. Additional methods for presenting the results of the process to the Council include an annual presentation as a part of the capital budgeting process. Other methods may be developed as necessary. Council makes the decisions about funding for the implementation of the traffic calming measures.

STAGE 4: PROJECT IMPLEMENTATION

Administration will create detailed engineering drawings, if necessary, prior to installation. Once the detailed drawings are prepared, the capital cost estimates should be updated and refined for budgeting purposes.

The City will mail a letter to all dwelling units and commercial properties within the study area to disclose the anticipated construction start date.

Administration may decide it is beneficial to phase in the traffic calming plan using temporary or removable traffic calming measures such as flexible bollards. This will allow time to examine the impact of the measures and their effectiveness before committing funding to permanent treatments.

STAGE 5: PROJECT EVALUATION

EVALUATION & MONITORING

Outcome reviews will be undertaken 12 months following installation of traffic calming measures to evaluate effectiveness. The scope of outcome reviews will be dependent on the objectives of the project, and will generally include the collection of speed, volume, and collision data for comparison against pre-installation data.

- Due to the types of roads for which traffic calming will be implemented, it is highly unlikely that any significant collision trends will be present over an analysis period of 12 months. Additional time may be required to evaluate collision data after the traffic calming measures are implemented.
- The outcome review will in most cases not include a diverted traffic analysis. These may be considered if comparable data was collected prior to installation and this was a key objective for the installation.

Success with traffic calming will be a reduction in vehicle speed, volume, and/or collisions. Depending on the outcome achieved, Administration may choose to evaluate the site through the warrant/prioritization process to see if it still has a need for traffic calming and how it compares to other potential sites. If Administration decides that the traffic calming measures have not been effective, they may recommend additional traffic calming measures. Prior to implementing the additional traffic calming measures, a report will be delivered to Council reviewing the performance of existing traffic calming measures.

TYPES OF TRAFFIC CALMING MEASURES

PASSIVE MEASURES

Passive traffic calming measures do not require construction of physical modifications to the roadway. Passive traffic calming often results in lower cost and prevents constructing a more-permanent change to the roadway. Physical (vertical and horizontal) traffic calming measures will be considered by the City when either the passive measures have not alleviated the neighbourhood concerns or the City determines the need for their installation. Below is a list of passive measures.

EDUCATION

Activities that change people's perceptions and help alter driver behaviour are most preferred. Meetings and workshops with neighbours and the City can help implement and direct traffic calming applications. Most traffic problems are a result of human behaviour. Through outreach programs, slow down lawn signage, brochures, bumper stickers related to obeying the speed limit, neighbourhood watch programs, and the City's Active and Safe Routes to School program, residents can play a big part in spreading the information.

Advantages:

- Flexible in the duration of meetings, workshops, etc.
- Inexpensive compared to other alternatives

Disadvantages:

- Difficult to measure the effectiveness
- May take time to be effective
- Potential challenge in generating citizen participation

ROAD WATCH PROGRAM

Road Watch is a community-driven program that gives residents and visitors the opportunity to report dangerous and aggressive drivers to the Windsor Police Service (WPS). WPS operates the Road Watch Program, and the road watch citizen report forms are available at the City of Windsor Police Stations, or they can be obtained online at www.windsorpolice.ca.

Advantages:

- Inexpensive compared to other alternatives

Disadvantages:

- Difficult to measure the effectiveness
- May take time to be effective
- Potential challenge in generating citizen participation

TARGETED SPEED LIMIT ENFORCEMENT

Targeted speed limit enforcement purpose is to make drivers more aware of their speed within a residential area. This measure typically only provides a temporary benefit, since speed limit enforcement is not available on a regular, on-going basis.

The Windsor Police work with the Transportation Department of the City in addressing speeding issues within residential areas.

Advantages:

- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short timeframe
- Automated speed studies can determine best enforcement times

Disadvantages:

- Effectiveness may be temporary
- Expensive to maintain a continued program of enforcement
- Fines lower than enforcement cost
- Time and resources constrained

RADAR SPEED FEEDBACK SIGNS

www.townofsananselmo.org

Post or pole-mounted radar speed feedback signs provide immediate feedback alerting the driver of their speed. Ideally this will encourage drivers to obey the speed limit. Additional enforcement or physical measures are encouraged to reinforce the treatment.

Advantages:

- Inexpensive
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short timeframe

Disadvantages:

- Requires power source
- Only effective for one direction of travel
- Long-term effectiveness is uncertain
- Subject to vandalism

VEHICLE ACTIVATED WARNING SIGNS

unipartdorman.com

Solar powered electronic signs equipped with radar speed detectors alert drivers of hazards ahead when activated by speeds surpassing a programmed threshold.

The advantages and disadvantages are the same as the radar speed feedback signs.

PAVEMENT MARKINGS

alertdriving.co.nz

ctre.iastate.edu

Pavement markings, such as traverse bars or chevrons, may be used to provide drivers more notice about their speed. These are only appropriate in certain areas, such as rural locations or transition zones where drivers are being reminded of a change in roadway character.

Advantages:

- Inexpensive
- Quick implementation
- No increase in noise
- No impact to emergency vehicles, snow plowing, street sweeping, and police
- No adverse effect on vehicle operations

Disadvantages:

- Requires regular maintenance
- May be less effective during winter months due to snow/ice cover

ON-ROAD SIGN PAVEMENT MARKINGS

google.com/maps (Queen St. S., Hamilton, Ontario)

google.com/maps (S. Sterling Ave., Tampa, Florida)

Sign pavement markings may be used to provide on-road messages, such as “MAX 50 km/h”, “Stop Ahead”, “School Ahead”, or “SLOW”. The advantages and disadvantages are the same as the pavement markings.

ON-STREET PARKING

google.com/maps (McKay Ave, Windsor, ON)

On-street parking may help to lower speeds along streets by narrowing the travel lanes and encouraging drivers to be more alert for vehicles or other drivers entering or exiting vehicles.

Advantages:

- Inexpensive
- Vehicle speed and traffic volume reduction
- Reduced traffic noise
- Provides a buffer between traffic and pedestrians on the sidewalk

Disadvantages:

- May reduce visibility for pedestrians crossing the roadway
- May reduce visibility for motorists exiting their driveway to enter the roadway
- May obstruct street sweeping and snow removal operations
- Could increase rear-end or sideswipe collisions

ROAD DIET

Roadsbridges.com

Reconfiguration of a roadway to allocate reclaimed road width for other uses, such as turning lanes, bike lanes, pedestrian refuge islands or parking.

Advantages:

- Low cost
- Vehicle speed reduction

Disadvantages:

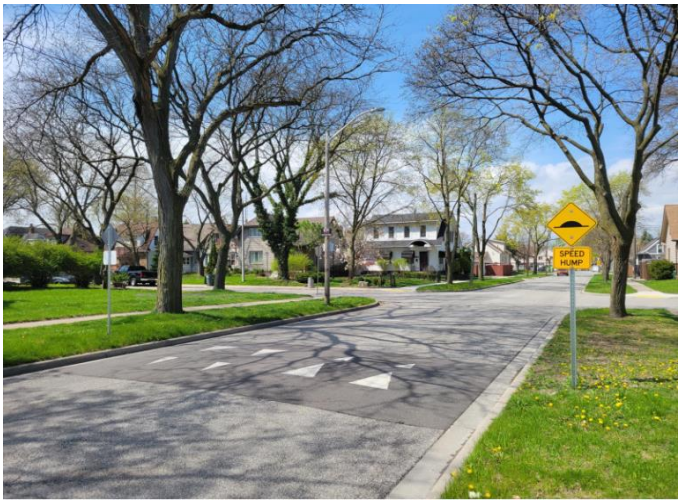
- Additional pavement markings require regular maintenance

PHYSICAL VERTICAL TRAFFIC CALMING

Vertical traffic calming measures provide an obstruction that vehicles can travel over. The change in pavement height (and sometimes pavement materials) can cause discomfort to the occupants of vehicles that are exceeding the design speed of the traffic calming measure. It should be noted that most vertical traffic calming measures are not preferred along roadways that are emergency vehicle routes or transit routes. To reduce the chances of potential liability issues, vertical traffic calming measures should be signed and marked in accordance with reference material provided by the Institute of Transportation Engineers (ITE) and the Transportation Association of Canada (TAC) as provided within the Canadian Guide to Traffic Calming - Second Edition, published in February 2018.

Vertical traffic calming measures typically perform better when they are installed in a series, as opposed to a single isolated measure. The deceleration and acceleration of a vehicle, while negotiating a series of vertical traffic calming measures, is dependent on the number and spacing of the installations. The implementation of vertical traffic calming measures can result in some traffic diverting onto parallel streets. This essentially moves the cut through traffic problem to another location instead of solving it. Consideration should be placed on the concept of improving the overall neighbourhood. Below is a list of vertical traffic calming measures.

SPEED HUMP



Kildare Road South of Onieda Court, Windsor, ON

Victoria Avenue South of Park Street, Windsor On

Speed humps provide a vertical, tactile alert to drivers, encouraging lower speeds. Speed humps are typically 80mm in height and 4m in length.

Advantages:

- Low Cost
- Effective in reducing vehicle speed

Disadvantages:

- Increases response time for emergency vehicles
- Negative impact on transit buses
- Increases noise and air pollution in neighbourhood

Note: The City of Windsor does not recommend fully painting speed humps with a solid colour. Fully painting a speed hump with a solid colour could potentially create a safety hazard by reducing traction, especially when wet, causing wheels to slip. This hazardous condition can potentially lead to accidents, especially for motorcyclists and cyclists.

If required due to sign visibility, speed hump visibility or other factors, speed hump warning signs may be considered for placement in advance of the speed hump.

TEXTURED CROSSWALK

www.fhwa.dot.gov

Berkley, CA

Brick pavers or other materials are used to help distinguish the pedestrian crosswalk from the roadway. This feature may also help to remind drivers to remain alert to the presence of pedestrians and other non-motorized traffic.

RAISED CROSSWALK

www.fhwa.dot.gov

Alexandria, Virginia

Raised crosswalks serve as a visual and tactile alert to drivers of the presence of pedestrians and other non-motorized traffic.

Advantages:

- Provides a more visible pedestrian crossing
- Quicker response time for emergency vehicles than speed humps
- Effective in reducing vehicle speed, but not as well as speed humps
- Addition of brick or textured materials can improve aesthetics

Disadvantages:

- More expensive than speed humps
- Increases response time for emergency vehicles
- Increases noise and air pollution in Neighbourhood
- May be damaged by snow plows

RAISED INTERSECTION

www.fhwa.dot.gov

google.com/maps (Riverside Dr at Riverdale Ave, Windsor, ON)

Raised intersections provide visual and tactile encouragement for drivers to lower their speed, particularly on their approach to the intersection where non-motorized traffic especially may be present.

Advantages:

- Provides a more visible pedestrian crossing
- Provides traffic calming along two roads
- Quicker response time for emergency vehicles than speed humps
- Effective in reducing vehicle speed, but not as well as speed humps
- Addition of brick or textured materials can improve aesthetics

Disadvantages:

- Very expensive compared to speed humps and speed tables
- Increases response time for emergency vehicles
- Increases noise and air pollution in the surrounding neighbourhood
- Could create drainage impacts
- May be damaged by snow plows

PERMANENT & TEMPORARY TRANSVERSE RUMBLE STRIPS

Ctre.iastate.edu

Grand Marais Rd, Windsor, ON (2024)

Transverse rumble strips are raised bars, grooves, or buttons closely spaced at regular intervals on the roadway that create both noise and vibration in a moving vehicle. They are used to alert the driver of an upcoming traffic control.

Advantages:

- Require little to no maintenance
- No effect on resident access, on-street parking, street sweeping and police enforcement

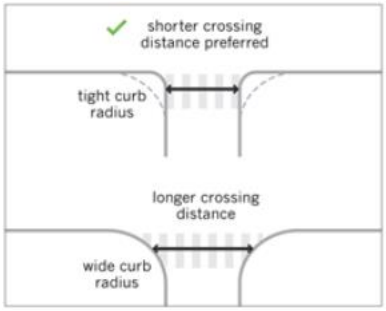
Disadvantages:

- Negative effect on snow plowing operations
- Increased noise level in immediate vicinity
- May detract from appearance of street

PHYSICAL HORIZONTAL TRAFFIC CALMING

Horizontal traffic calming measures incorporate raised islands and curb extensions to prevent vehicles from traveling in a straight line at excessive speeds. Vehicles either slow down while maneuvering around the horizontal obstacle, or slow down due to the physical perception of a narrower roadway. To reduce the chances of potential liability issues, horizontal traffic calming measures should be signed and marked in accordance with reference material provided by the Institute of Transportation Engineers (ITE) and the neighbourhood Traffic Calming (TAC). The implementation of horizontal traffic calming measures can result in some traffic diverting onto parallel streets. This essentially moves the problem instead of solving the problem. Consideration should be placed on the concept of improving the neighbourhood (not just improving the street). Below is a list of horizontal traffic calming measures.

CURB RADIUS REDUCTION



www.mto.gov.on.ca

Reductions in curb radii force drivers to manoeuvre turns at lower speeds, encouraging lower speeds on the approaches to the intersection.

Advantages:

- Shortens pedestrian crossing time
- Forces vehicles on approach to come to a full stop

Disadvantages

- Large axle vehicles are unable to negotiate the turn without driving over the sidewalk, which puts pedestrian safety at risk

LANE NARROWING

www.fhwa.dot.gov

Narrow lanes tend to encourage lower speeds as drivers feel slightly constricted. This may be achieved through physical alterations as well as the addition of on-street parking, bike lanes, pavement markings, movable planters or traffic calming curbs.

Advantages:

- Up to a 10km/h speed reduction in 85th percentile speed
- If lanes are physically narrowed and space is not allocated to other modes, then there would be a reduced crossing distance for pedestrians
- Quick implementation if using pavement markings and no physical change
- Less impact on traffic noise, fuel consumption, and emissions compared to speed humps
- No effect on emergency vehicles, resident access, snow plowing, street sweeping, and police enforcement

Disadvantages

- Cyclist may feel squeezed closer to vehicles if no bicycle lanes are provided.
- Pavement markings require regular maintenance
- Pavement markings may be less effective in the winter months due to snow/ice cover
- Reduced separation between oncoming vehicles

FLEXIBLE POSTS/EDGE BOLLARD

Calderwood Ave near Bliss Ave, Windsor, ON

Totten St, Windsor, ON

Flexible posts can be used to give drivers the perception of lane narrowing and create a sense of constriction. Flexible posts anchored to the pavement to create or extend centre medians, bulb-outs or chicanes.

Advantages:

- Up to 5km/h speed reduction in 85th percentile speed
- If lanes are physically narrowed and space is not allocated to other modes, then there would be a reduced crossing distance for pedestrians
- Quick implementation if using pavement markings and no physical change
- Less impact on traffic noise, fuel consumption, and emissions compared to speed humps
- No effect on emergency vehicles, resident access, snow plowing, street sweeping, and police enforcement due to its removal during the winter season and its ability to bend and regain its ability to stand back up

Disadvantages

- Cyclist may feel squeezed closer to vehicles if no bicycle lanes are provided
- Pavement markings require regular maintenance
- Pavement markings may be less effective in the winter months due to snow/ice cover
- Reduced separation between oncoming vehicles

TRAFFIC CALMING CURB

facebook.com/MunicipalityofLeamington

(Talbot St. W. at Queens Ave.),

South National St, Windsor, ON

Precast concrete curb used to create curb extensions, traffic circle centre islands, chicanes or protected bicycle lanes.

Advantages:

- Quick implementation
- If lanes are physically narrowed and space is not allocated to other modes, then there would be a reduced crossing distance for pedestrians
- Minimal effect on emergency vehicles, resident access, street sweeping, and police enforcement

Disadvantages

- May effect snow plow, depending on the location if placed during the winter season

RAISED MEDIAN ISLAND

www.fhwa.dot.gov

google.com/maps (Rossini Blvd at Wyandotte St, Windsor, ON)

Raised median islands may be used to provide a physical refuge area for pedestrians and other non-motorized traffic. They may also be used to help narrow travel ways. These features help to encourage lower driver speeds.

Advantages:

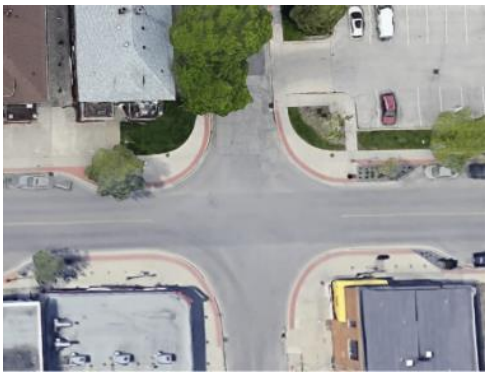
- If designed well, can have a positive aesthetic value
- Opportunity for landscaping and improved aesthetics

Disadvantages:

- Effectiveness is limited by the absence of vertical deflection
- May interrupt driveway access to adjacent properties
- Increased cost for maintenance of landscaping if this measure involves landscaping

SIDEWALK/CURB EXTENSION

Contextsensitivesolutions.org



google.com/maps (Erie St at Langlois Ave, Windsor, ON)

Curb extensions reduce the distance pedestrians and other non-motorized traffic must travel when crossing the street. They may also be used to narrow travel ways, or reduce curb radii, slowing driver speeds.

Advantages:

- Encourages a safer pedestrian environment by providing a shorter crossing distance and
- increased visibility
- Very effective in front of elementary schools in addressing pick-up, drop off parking
- issues
- Prevents parking too close to intersections, keeping sight lines open
- Opportunity for landscaping and improved aesthetics

Disadvantages:

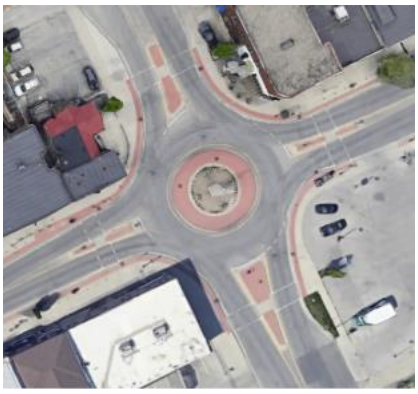
- Effectiveness is limited by the absence of vertical deflection and if traffic volumes are low
- Difficult for right-turning emergency vehicles
- Increased cost for maintenance of landscaping if this measure involves landscaping
- May require bicyclists to briefly merge with vehicular traffic

TRAFFIC CIRCLE/ROUNDABOUT

google.com/maps (35th & Raleigh St., Denver, CO

google.com/maps (Sandwich St., Windsor, ON)

google.com/maps (Banwell Rd at Mulberry Dr)



google.com/maps (Erie St at Parent Ave, Windsor, ON)

Traffic circles and roundabouts require drivers to slow their approach and yield to traffic while transitioning through the intersection. May be designed to be traversable for larger vehicles and emergency response vehicles.

Advantages:

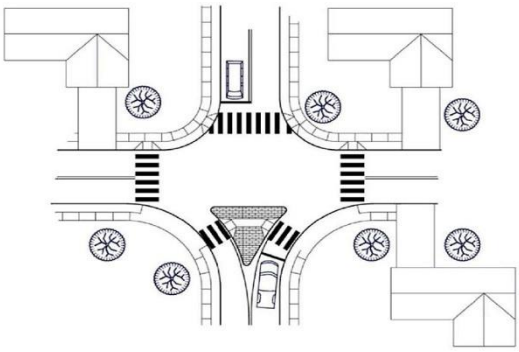
- Effective in reducing vehicle speed
- Improved traffic flow
- Can reduce severity of motor vehicle collisions
- Reduction in left-turn collisions
- Opportunity for landscaping and improved aesthetics
- Reduction in noise and air pollution compared to signalized and stop controlled intersections

Disadvantages:

- Difficult for left-turning emergency vehicles
- Possible need for right-of-way, depending on size of raised island
- Increased cost/labor for maintenance of landscaping if this measure involves landscaping

RIGHT-IN/RIGHT-OUT ISLAND

www.fhwa.dot.gov



www.fhwa.dot.gov

Right in/right out islands are raised triangular islands located on an intersection approach to limit the side street to right turn in and out movements. They restrict vehicle flow to help eliminate left turn movements into and out of driveways, reducing the potential for conflicts.

The advantages and disadvantages are the same as the directional closure. In addition, there may be increased safety risk for pedestrians as drivers may be focused on turning their heads to view oncoming traffic and not pay attention to pedestrians on their right side trying to cross.

CHICANES

en.wiktionary.org/wiki/chicane

www.fhwa.dot.gov

Chicanes are bump-outs on opposite sides of the road that require drivers to slow down to zigzag through the roadway configuration.

Advantages:

- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by emergency vehicles
- Opportunity for landscaping and improved aesthetics

Disadvantages:

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be expensive, especially if there are drainage issues
- Increased cost/labor for maintenance of landscaping if this measure involves landscaping

PHYSICAL OBSTRUCTION

Physical obstructions are the most severe traffic calming tool and are only used when it is determined a vertical or a horizontal measure won't address the identified problem. The primary purpose of physical obstructions is to eliminate cut through traffic by prohibiting specific vehicle movements. It is important to note that physical obstructions are intended to deter motor vehicle traffic only and not to obstruct bicycle or pedestrian traffic. These types of measures are typically implemented at intersections, but may also be applied at some mid-block locations. Obstructions range from those that have a relatively minor impact on vehicular access to those that severely restrict access such as a road closure. It is important to remember once the vehicle restricted movement is in place area residents must live with it every day. Below is a list of obstructive traffic calming measures.

DIRECTIONAL (HALF) CLOSURE

www.stocktongov.com

Charleston, South Carolina

Partially restricts the flow of vehicles along the street. This measure is strictly for volume control and has little impact on driver speeds.

Advantages

- Traffic volume reduction up to 60%
- There may also be a reduction in travel speeds around the intersection
- Eliminates right angle collisions

Disadvantages

- Restricts resident access to the neighbourhood; and
- May divert significant volume of traffic to parallel streets that do not have traffic calming measures

FULL CLOSURE

www.victoria.ca

Los Angeles, CA

A full closure or cul-de-sac eliminates through traffic for motor vehicles at one end of a road, serving as a volume control measure.

Advantages

- Eliminates all cut through traffic
- Eliminates right angle collisions
- Reduced traffic noise

Disadvantages

- Restricts resident access to the neighbourhood
- May divert significant volume of traffic to parallel streets that do not have traffic calming measures
- May restrict emergency vehicle access

DIAGONAL DIVERTER

www.sanantonio.gov

Halifax, NS

Diagonal diverters allow some traffic to flow through the intersection in restricted ways to discourage (not necessarily eliminate) through traffic.

- Traffic volume reduction between 20% and 70%
- Eliminates right angle collisions

Disadvantages

- Restricts resident access to the neighbourhood; and
- May divert significant volume of traffic to parallel streets that do not have traffic calming measures

RAISED MEDIAN THROUGH INTERSECTION

www.pedbikesafe.org

Little Rock, AR

Raised medians through an intersection prohibits cross traffic in one direction. This helps reduce or eliminate through traffic in one direction. Small gaps may be included to allow bicycle and other non-motorized traffic to pass through.

The advantages and disadvantages are the same as the directional closure.

TURN PROHIBITION SIGN

www.fhwa.dot.gov

Turn prohibitions should serve a similar purpose as directional closures or diagonal diverters. The advantages and disadvantages are the same as the directional closure.

THROUGH PROHIBITION SIGN

www.fhwa.dot.gov

Through traffic prohibitions should serve a similar purpose as full closures, diagonal diverters, or raised medians through intersections. The advantages and disadvantages are the same as the full closure.

TRAFFIC CALMING NEIGHBOURHOOD SIGN

Dandurand Avenue, Windsor, ON

www.citywindsor.ca

Traffic Calmed Neighbourhood signs help to alert drivers of the presence of traffic calming measures. Ideally this will provide additional encouragement for drivers to lower speeds and increase alertness to the presence of non-motorized traffic. Only used in conjunction with physical traffic calming measures.