TOWN OF SHEDIAC
TRAFFIC CALMING POLICY

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PROPERTY AND CONFIDENTIALITY

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1 INTRODUCTION

The Town of Shediac strives to create and maintain a safe environment for its residents to call home and for visitors to enjoy. As part of this safety mandate, the Town is committed to ensuring that any concerns residents have about the safety of the Town's road network are heard and managed in an appropriate manner. While the range of possibilities with public road safety concerns can be quite broad, many reported concerns in the Town pertain to the speed and volume of traffic on local neighbourhood streets.

The main approach that can be used to mitigate safety concerns regarding the speed and volume of traffic on local or collector roads is called traffic calming. Traffic calming is the deliberate implementation of mainly physical traffic management strategies to mitigate the impacts of traffic on local and collector roads. These strategies make the local and collector roads less desirable as alternatives to arterial roads, which helps to keep the roads in a neighbourhood functioning as they were intended.

1.1 POLICY GOALS AND OBJECTIVES

Crandall, a Division of Englobe Corp., was retained by the Town of Shediac to create a Traffic Calming Policy for the Town. The goal for the policy is to provide a framework for incorporating traffic calming strategies into the Town's roadways in a manner that improves safety for all road users and helps the Town maintain livable residential neighbourhoods.

The main objective of this policy is to ensure that the roads within the Town are functioning as they were intended. Objectives that may pertain to projects on local and collector roads that are undertaken through this policy include:

- Reduce vehicle speeds;
- Discourage cut-through traffic;
- Minimize conflicts between street users;
- Reduce need for traffic enforcement; and
- Improve the neighbourhood environment.

1.2 PROJECT TASKS

To develop this policy, the following tasks were undertaken by the study team:

- Review of pertinent guidelines on traffic calming infrastructure and policy;
- Jurisdictional scan of traffic calming policies;
- Establishing screening and ranking metrics for traffic calming projects in the Town;
- Reviewing best practices on additional specified strategies (all-way stop, children-at-play signs, portable speed display signs); and
- Drafting the policy document for the Town.

2 BACKGROUND

2.1 ROAD CLASSIFICATIONS

One of the primary goals for traffic calming is to ensure that road networks operate as they were intended. The intended purpose of roads in a network is often defined by road classifications. These classifications, and their application in the Shediac context, are summarized below.

Local: The purpose of local streets is to provide land access. Local streets are not intended to provide through routes for traffic. Chatellerault Street and Paturel Street are examples of local streets in the Town.

Collector: Collector streets balance needs for land access with connecting local roads to arterials, so some through movements for local traffic are expected on these roads. Depending on the traffic volumes, collectors are often designated as either major or minor. Breaux Bridge Street and Chesley Street are examples of a minor collector street in the Town while Main Street is a major collector.

Arterial: These streets are expected to carry significant through traffic between major destinations with little disruption for land access. Ohio Road is an example of an arterial street in the Town.

2.2 CANADIAN GUIDE TO TRAFFIC CALMING

The *Canadian Guide to Traffic Calming (Second Edition)*, published by the Transportation Association of Canada (TAC) and the Canadian Institute of Transportation Engineers, provides a detailed overview of how to create a local process for triaging and managing traffic calming projects and a toolbox of numerous treatment options. The Guide is tailored towards treatments on local and collector streets, with some consideration for speed management options on arterial roads as well.

The Guide recommends that the application of traffic calming measures follow a set of guiding principles. These principles can be broadly summarized into four categories, as detailed below:

Understanding the problem: When a traffic calming request is initiated, it is important to thoroughly study the area to gain a sense of what problem exists (if any), the severity of the problem, and the root cause of the problem. These steps are important to ensure that traffic calming measures are being installed where they are most needed and will have the greatest impact on the network. There are many scenarios where speed management and cut-through issues on local or collector streets are due to traffic management issues on a neighbouring arterial road and that better management of the arterial would be the most effective traffic calming solution. Additionally, some problem areas can be improved by creating a local culture of calmed driving through applying traffic calming measures throughout a neighbourhood instead of just focusing on a few specific locations that receive requests.

Choosing the right solutions: Once a problem has been defined, there are often several different solutions that can be applied. Solutions can vary in cost, complexity, and effectiveness, so it is important to assess all the available options and tailor a solution that matches scope and severity of the problem. Some problems may only require education or enforcement and while these solutions may seem simple, they can be effective if applied judiciously. The potential impacts of solutions on emergency vehicles, transit, and other modes of transportation must also be considered.

Avoid limiting road user options: While installing diversions, closing roads, and other similar measures may be necessary to control severe cut-through problems, they should be avoided wherever possible due to

the outsized impact they have on the residents who live near them. Some of these solutions have impacts on other transportation modes (transit, cycling, pedestrians, etc.) and emergency vehicle movements that must be considered as well.

Evaluate the effectiveness of the solution: Implementing effective traffic calming is partly about learning what works best in an individual jurisdiction. When a measure is installed, an evaluation plan should be put in place to study the effect that it had. This information will be vital to helping the jurisdiction choose the right solutions for future problems.

The TAC Guide also discusses the importance of engaging a wide variety of stakeholders in traffic calming projects. Depending on the jurisdiction, stakeholder groups could include the road authority, elected officials, emergency services, transit authorities, the public-at-large, businesses and residents that are directly impacted, community groups, and advocacy groups. Community engagement is particularly vital to traffic calming projects; more often than not, the request for these projects will come from the community and it is essential to ensure that the community feels heard and that their issues are being addressed in a meaningful way. This can be doubly true for proposed solutions that have negative impacts on communities, such as diversions and road closures.

2.3 JURISDICTIONAL REVIEW

In further support of developing this Traffic Calming Policy, a review of similar policies and guidelines from jurisdictions across Canada was undertaken. Emphasis was placed on identifying policies from jurisdictions that are comparable to the Town of Shediac, though many of the jurisdictions identified have significantly larger populations. Table 1 provides a summary list of the Traffic Calming Policies that were reviewed in the preparation of this policy.

Table 1: List of Reviewed Traffic Calming Polices

JURISDICTION	POLICY PUBLISH DATE	POPULATION
La Salle, ON	2020	30,180
Lloydminster, AB	2014	31,410
Orillia, ON	Unknown	31,166
Quispamsis, NB	Unknown	18,245
Saint John, NB	2012	70,785
Springwater, ON	2020	19,059
St. John's, NL	2016	113,948
Torbay, NL	2011	7,899
West Kelowna, BC	2016	32,655
White Rock, BC	2017	19,952
Vernon, BC	2006	40,116

3 TOWN OF SHEDIAC'S TRAFFIC CALMING PROCESS

The traffic calming process detailed in this section is based on the five-stage process outlined in the *Canadian Guide to Traffic Calming (Second Edition)* with some aspects drawn from the jurisdiction scan. A process map is shown in Figure 1 to provide an overall view of the process that is detailed over the following sections.

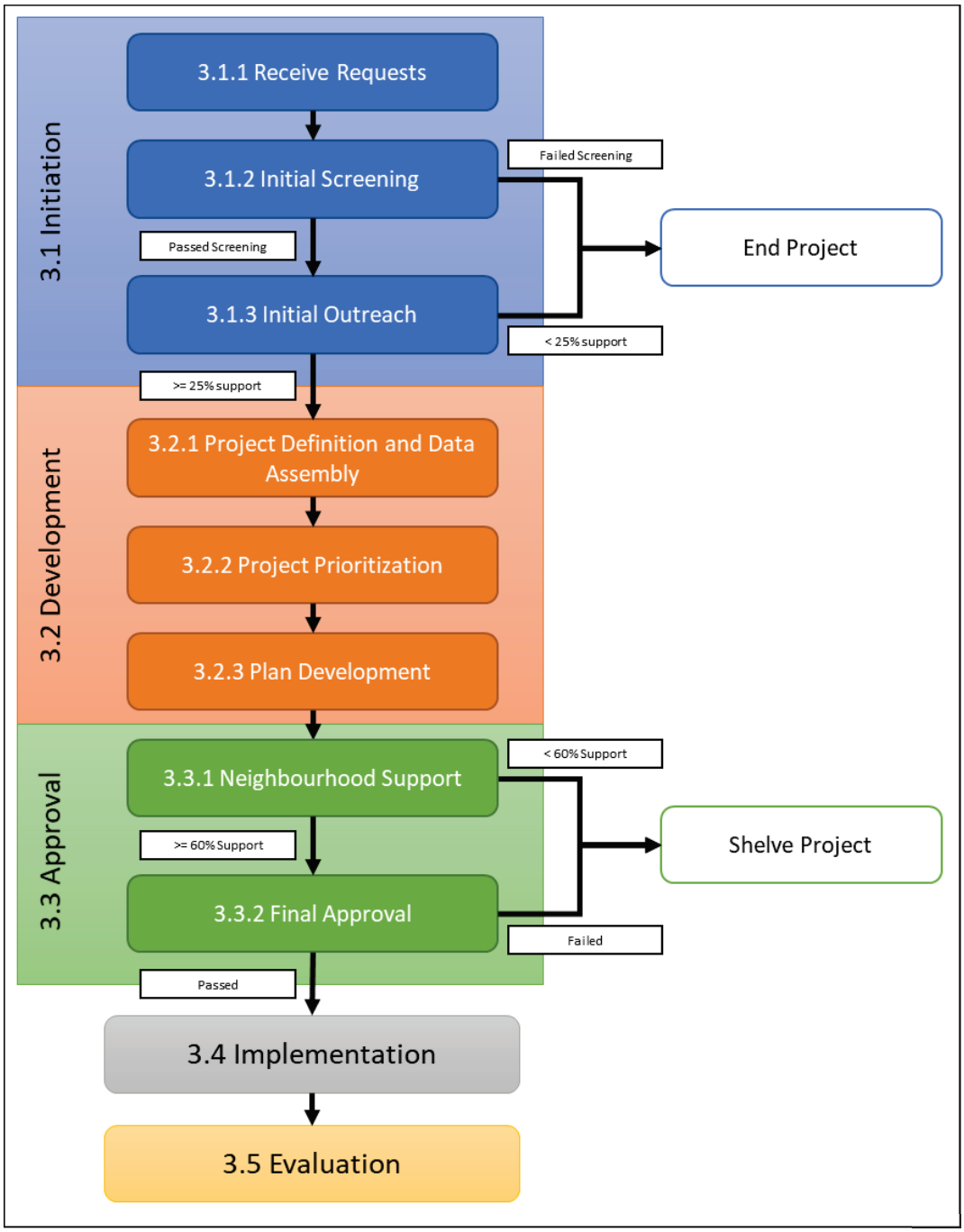


Figure 1: Town of Shediac Traffic Calming Process

3.1 INITIATION

The purpose of this stage is to develop a thorough understanding of the nature and severity of the problem. It contains formalized processes to receive requests for traffic calming, screen requests to identify those that merit further evaluation, and gather broader community feedback on the nature of the problem.

3.1.1 Receive Requests

The Town should provide guidance to citizens on how to submit an official traffic calming request. Many jurisdictions accomplish this by creating a form for citizens to fill out and submit, but other approaches can also be used. A single designated staff member should receive and manage all requests sent to the Town to ensure that all requests, regardless of the source (public, council, etc.), are handled through the same process. Information that should be required from the applicant includes:

- Name and contact information for the applicant;
- Specific location of the issue;
- A checklist of the type of traffic concerns (high speeds, safety, aggressive driving, etc.);
- Additional detail about the concerns; and
- Suggested traffic calming solution.

3.1.2 Initial Screening

When a request is received, it must be screened to assess whether the issue described in the request can be managed through traffic calming. The screening criteria for a traffic calming request are provided in Table 2 and were selected based on their ease of collection and effectiveness at filtering out locations that are not suitable for traffic calming in the Town. Each of the criteria in Table 2 must be met for the request to move forward.

Table 2: Initial Screening Criteria

CRITERION	REQUIREMENT
Land Use	At least one of: (1) primarily residential, (2) pedestrian oriented, and/or (3) adjacent to a facility for vulnerable road users (parks, schools, senior centres, etc.)
Road Classification	Local or collector street
Posted Speed	50km/h or lower
Road Grade	Less than 8%
Request History	No similar evaluations conducted within the last 12 months and no similar traffic calming plans for the site voted down at the approval stage in the last 24 months

After the initial screening has been completed, a follow-up email should be sent to the applicant with the status of their request. If the screening results in the request not being carried forward, justification should be provided.

3.1.3 Initial Outreach

Before starting the development of traffic calming solutions, an initial outreach to the Town's Protection Committee to gauge the general response to the complaint/request should occur. The Town's Protection

Committee consists of major stakeholders for the Town such as Town staff, councillors, fire and police department. In the outreach, the Protection Committee should be presented with the subject of the traffic calming request and asked if they feel that this issue requires traffic calming on the street suggested and if they have any further concerns in the area. The objective of this is to gauge if the issue is one that merits further investigation and investment from the Town and to identify if there are any additional community concerns that should be addressed alongside the initial request.

3.2 DEVELOPMENT

The goal of the development stage is to develop a plan for pursing appropriate traffic calming in response to the request. This encompasses formally defining the project area, collecting and assembling pertinent data, ranking the project using a warrant system, and creating a plan for implementing traffic calming measures.

3.2.1 Project Definition and Data Assembly

Defining the project area is an important formal step towards locking in the scope of the project. It is important that the definition area covers any areas that are expected to be impacted by the implementation of traffic calming, possibly including neighbouring streets and intersections depending on the type of issue being managed through traffic calming.

With the project area defined, relevant data must be collected to assist with identifying the appropriate traffic calming strategies to implement and their priority when compared against other traffic calming projects. Table 3 summarizes the common data needs for traffic calming projects. A site visit should be conducted to thoroughly examine the existing conditions and new traffic counts and/or speed studies may be required to support further decision making.

Table 3: Data Requirements for Traffic Calming Investigations

Traffic Characteristics:	Transportation System:
⬡ Pedestrian and cyclist volumes ⬡ Traffic volumes (ADT, intersection movements) ⬡ Speeds (average and 85th percentile) ⬡ Vehicle classification ⬡ Collision history	⬡ Pavement markings and signage ⬡ Sight distances ⬡ Posted speed limit ⬡ Pedestrian and cyclist facilities ⬡ Special route designations (truck, school, emergency, etc.) ⬡ Existing traffic calming measures
Roadway:	**Street Environment and Land Use:**
⬡ Road classification ⬡ Road cross section (lanes, parking, sidewalks, etc.) ⬡ Curve radii, grades, and tangent lengths ⬡ Intersection diagrams ⬡ Utility locations ⬡ Existing traffic controls	⬡ Adjacent land use (commercial, retail, residential, industrial) ⬡ Building setbacks ⬡ Number, location, and width of driveways ⬡ Trees and landscaping features ⬡ Location of community facilities (child care, schools, senior's residences, etc.)

In gathering the relevant data for the project, the Town's emergency services must be consulted on how they use the project area for emergency vehicle routes. Many traffic calming measures can delay the response times for emergency vehicles, so it is important to understand and accommodate the needs of emergency services through the plan development process.

3.2.2 Project Prioritization

The key parameters that should be considered in determining the priority of traffic calming projects are the 85th percentile speed on the roadway(s), traffic volume, collision history, proximity of pedestrian generators, and access to pedestrian facilities. A scoring system was developed based on these parameters, as shown in Table 4, so that the Town can objectively compare the need for traffic calming between different requests, with higher scores indicating higher priority. The criteria scores and maximum points per category were developed through the jurisdiction scan and tailored to match the Town's needs, though some calibration may be required as the system is applied. For a project to continue to the Plan Development stage it must score at least 20 points based on the criteria in Table 4, though actually progressing with Plan Development is at the discretion of the Town based on project prioritization and budget constraints. Example case studies of applying the scoring system can be found in Appendix A.

Table 4: Ranking Criteria and Scoring for Traffic Calming Projects

PARAMETER	CRITERIA	MAX POINTS
85th Percentile Speed	**1 point** for every km/h that the 85th percentile speed is between 1-10 km/h over the posted speed limit, plus **2 points** for every km/h that the 85th percentile speed is between 11-20 km/h over the posted speed limit	30
Traffic Volume (ADT)	*Local roads:* **1 point** for every 50 ADT over a minimum of 500 *Collector roads:* **1 point** for every 100 ADT over a minimum of 1000	30
Collisions	**2 points** for every collision in the previous three years in the study area involving a vulnerable road user (i.e. pedestrian, cyclists)	10
Pedestrian Generators	**5 points** for every pedestrian generator within the study area (playground, senior's center, community centre, school, retail, trail, etc.)	15
Pedestrian Facilities	**15 points** for streets with no pedestrian facilities	15

3.2.3 Plan Development

The first step of developing a traffic calming plan is to identify potential strategies that could be implemented to achieve the desired results. A toolbox has been presented in Section 4 of this policy to help begin the search for appropriate traffic calming strategies. The toolbox is structured to present groups of strategies that require increasing levels of investment, beginning at Level 1 (Passive) and moving up to Level 3 (Permanent). Even projects with high priority scores can benefit from applying passive or temporary strategies at first to gauge the potential effectiveness of permanent strategies.

Once potential strategies have been identified, design alternatives should be created for evaluation. The number of alternatives depends on the complexity and scale of the problem being addressed; smaller

projects may only have one reasonable solution while larger projects could have several. At this stage it is also important to consider how multiple strategies could be combined to achieve the net effect desired for the area.

The traffic calming alternatives, and a "Do Nothing" option, should be analyzed to assess the benefits, disbenefits, and costs of each alternative. The objective of the analysis should be to help identify the alternative that maximizes benefits while minimizing disbenefits at a reasonable cost for the project. Factors that should be considered through this process include:

- Effectiveness of the alternative at addressing the problem;
- Local impacts of the traffic calming measures;
- Emergency vehicle access;
- Road maintenance;
- Safety for all road users;
- Environmental and streetscape impacts;
- Constructability and ease of implementation; and
- Capital, operating/maintenance, and enforcement costs.

Once the optimal plan has been identified, a finalized concept plan should be developed for presentation to the neighbourhood residents and council.

3.3 ACCEPTANCE/APPROVAL

The goal for the acceptance stage is to allow community and council stakeholders the opportunity to review the plan and provide feedback that can ensure successful implementation of the project. Depending on the feedback provided, adjustments to the plan may be required. If at any point in the approval process the project does not have enough support to proceed to implementation, the work completed on the project should cease with a note explaining the roadblocks faced by the project. If the traffic situation persists, alternative solutions may be considered, or the same traffic calming solution may be presented again after a 24-month period has passed.

3.3.1 Neighbourhood Support

Implementing traffic calming in a neighbourhood has a significant impact on the residents near the project area. While they will get the most benefit from living in a traffic calmed neighbourhood, they will also be the people most impacted by any disbenefits to the proposed solution. Achieving significant support from the neighbourhood is critical to the long-term success of the project.

The finalized concept for the optimal plan should be communicated to the residents and stakeholders who will be most affected by implementing the traffic calming plan. This can be accomplished in several ways depending on the scale of the project and types of stakeholders affected (flyer, mail/email, pop-up event, running a pilot project, etc.). The plan should receive at least 60% support from neighbourhood stakeholders before proceeding to Council.

3.3.2 Final Approval

Once neighbourhood support has been obtained, and any plan updates have been completed, a final package should be submitted to Council for review. Upon approval from Council, the plan can move forward to the implementation stage.

3.4 IMPLEMENTATION

The goal of the implementation stage is to enact the traffic calming strategies in the project area. If the plan includes multiple traffic calming strategies, they ought to be prioritized from lowest level to highest level for implementation (where applicable). It can also be beneficial to install temporary measures in advance of permanent ones to evaluate the potential effectiveness of the permanent solution. This can often be accomplished through installing temporary signage, barriers, and construction delineators in the roadway in the desired configuration.

3.5 EVALUATION

The goal of the evaluation stage is to learn how well the traffic calming measure achieved its intended purpose. This is important for two reasons: 1) so that the Town can learn how the measures work in their neighbourhoods and 2) so that the Town can share the results with other similar jurisdictions. Much of the published findings on traffic calming measures, and most other traffic facilities, are based on studies in larger urban centres and these findings are not always transferable to smaller towns. The experience gained by Shediac through the evaluation of traffic calming measures would be a significant benefit to other smaller jurisdictions throughout the Maritimes and beyond.

A plan should be put in-place to monitor and evaluate the traffic and speed conditions in the project area about 6-12 months after implementation. For more complex projects, following up with neighbourhood stakeholders on their perceived impacts of the traffic calming would be beneficial.

4 TRAFFIC CALMING STRATEGY TOOLBOX

The toolbox of traffic calming strategies for the Town of Shediac is divided into three levels of increasing delivery costs and, generally, increasing traffic calming effectiveness. A listing of the strategies sorted by level, along with the traffic calming goals that each strategy can achieve, is shown in Table 5, with more detailed descriptions of the strategies over the following sections. Note that two of the Level 1 strategies (Education Materials and Neighbourhood Association) may not directly result in achieving traffic calming goals. These strategies were included in the toolbox as they can be an integral part of improving the effectiveness of other strategies and/or improving the Town's overall traffic calming process.

Table 5: Traffic Calming Strategy Toolbox

STRATEGY	GOALS				
	Reduce Speed	Reduce Traffic	Minimize Conflicts	Reduce Enforcement	Improve Environment
LEVEL 1: PASSIVE STRATEGIES					
Speed Display Signs and Data Collection	X		X		
Evaluate Existing Signage and Pavement Markings			X		X
Education Materials					
Specialized Enforcement	X				
Enhance Visibility			X		X
Neighbourhood Pace Car Pledges	X			X	
Neighbourhood Association					
LEVEL 2: TEMPORARY STRATEGIES					
Lane Narrowing	X				
On-Road 'Sign' Pavement Markings	X				X
Temporary Speed Humps	X	X	X	X	X
Vertical Centreline Treatment	X			X	
LEVEL 3: PERMANENT STRATEGIES					
Vertical Deflection					
Permanent Speed Hump	X	X	X	X	X
Speed Cushion	X	X	X	X	X
Speed Table / Raised Crosswalk	X	X	X	X	X
Raised Intersection	X		X	X	X
Horizontal Deflection					
Curb Extension / Choker	X			X	X
Curb Radius Reduction	X			X	X
Traffic Circle	X	X	X	X	X
Raised Median Island	X		X		
Chicanes	X	X	X	X	X

STRATEGY	GOALS				
	Reduce Speed	Reduce Traffic	Minimize Conflicts	Reduce Enforcement	Improve Environment
Access Control					
Directional Closure / Forced Turn	X	X	X		X
Diagonal Diverter		X	X		X
Full Closure		X	X		X
Other					
Complete Street	X		X	X	X
Pavement Surface Treatment	X			X	X

While this toolbox contains a listing of the common traffic calming strategies that the Study Team anticipates could be effective in the Town at the time of this published policy, it is not an exhaustive list of all possible traffic calming strategies that could be used. The use of any other strategies should follow guidance from TAC, the Canadian Institute of Transportation Engineers (CITE), the Federal Highway Administration (FHWA), the National Association of City Transportation Officials (NACTO), or another similar source and be categorized appropriately within the three level framework outlined below. Specific guidance on the implementation of all-way stop signs, children-at-play signs, and portable speed display signs is provided in Section 5.

4.1 LEVEL 1: PASSIVE STRATEGIES

The passive strategies focus on the educating drivers on appropriate behaviour and enforcing the behaviour through a variety of means.

Speed Display Signs and Data Collection

Speed display signs are an effective means of providing feedback to drivers on their travel speed. Most drivers choose their travel speeds based on their environment, so providing this feedback within the driving environment can have some speed reduction benefits. More detail on speed display signs and data collection can be found in Section 5.5.

Evaluate Existing Signage and Pavement Markings

While signage and pavement markings are always installed with the best of intentions, they are often maintained through direct replacement/repainting without consideration to how the road environment has evolved over time. Reviewing the signage and pavement markings at a site to improve positive guidance and sign/marking conspicuity has the potential to improve driver behaviour.

Education Materials

Drivers often develop bad habits over time due to their driving environments and can benefit from education materials that remind them of how they ought to be driving. 'Education materials' can be delivered through mailed flyers, the Town's website, social media, or any other similar outlet. Public education should be a component of any new-to-Shediac traffic calming measure so that residents and stakeholders have an introduction to how they should respond to the measure before they encounter one in the roadway.

Specialized Enforcement

Some sites could benefit from periodic traffic enforcement to reduce speeds and traffic volumes. Enforcement has been demonstrated as an effective solution, though the effectiveness is typically limited to when the enforcement vehicles are present at the location or shortly thereafter. In order to maintain benefits over the long term, the treatment will have to be repeated at regular intervals. Due to the cost of paying for enforcement, this passive strategy can become as costly as some of the temporary or permanent strategies listed below.

Enhance Visibility

In order to make roadways safe for all users, it is important to make sure that users can see each other. If the roadside is overgrown with vegetation or has other obstructions, drivers may not be able to see pedestrians or cyclists who are about to enter the roadway. Improved visibility may not help with speed or volume reductions, but it will help minimize conflicts between different groups of road users.

Neighbourhood Pace Car Pledges

Pace car pledges are volunteer programs set up within the neighbourhood where drivers pledge to drive within the speed limit and demonstrate good driving behaviour as a model for other drivers to follow. The drivers taking part in these programs often get bumper stickers/magnets for their car to promote awareness to other drivers. These programs have varied effectiveness, as they require buy-in from the neighbourhood to be successful, but they also have low costs for the road authority.

Neighbourhood Association

If a neighbourhood in the Town has several identified issues, establishing a neighbourhood association made up of residents from the area could be beneficial towards identifying and delivering upon traffic calming objectives. These groups are often tasked with disseminating information to their neighbours, meeting with council and other stakeholders to discuss Level 1 approaches, and act as a focus group for the development of Level 2 or 3 strategies.

4.2 LEVEL 2: TEMPORARY STRATEGIES

Temporary strategies involve making changes to the roadway environment through signage, pavement markings, and portable devices. The intention of installing temporary strategies should be as a stepping-stone towards installing permanent strategies. If traffic calming is installed on a street and later removed, for whatever reason, the Town should not expect the speed or volume reduction from the traffic calming strategy to be maintained after removal.

Lane Narrowing

Traffic lane narrowing is a tactic used to reduce vehicle speeds. Motorists tend to decrease their travel speed if a narrower lane width is implemented due to an uncomfortable experience driving higher speeds in narrower lanes. Furthermore, narrow lane widths bring additional benefits to the corridor such as less severe vehicle collisions, pedestrian and cyclist crossing distances are generally reduced, shorter signal times are required, and pedestrians are less exposed to conflicts with traffic. These benefits are a direct result of narrower vehicle lanes. Temporary lane narrowing can be achieved by pavement marking modifications or temporary delineators and left in place for one season.

The *TAC Geometric Design Guide for Canadian Roads* recommends a minimum lane width of 3.0m (measured to the edge of the gutter) for the curb lane on urban streets with speeds of 60 km/h or less. Where trucks and transit vehicles are expected to use the street frequently, a minimum lane width of 3.3m (plus gutter) is recommended. If a corridor has multiple lanes, then the center lanes are still recommended

at the minimal 3.0m width as truck and transit vehicles are expected to use the outside lanes. Narrow lanes can be designed with striping, vertical breakaway posts, landscaping, or curb extension and advanced roadway designs for a more permanent measure. When selecting lane widths, care must be taken to accommodate fire trucks, garbage trucks, or other specific design vehicles, as required.

On-Road 'Sign' Pavement Markings

On-road 'sign' pavement markings can be used to reinforce information that is being conveyed to drivers. Common messages include speed limits, 'SLOW', and 'STOP AHEAD'. These pavement markings should be used in conjunction with other regulatory and warning signage with the same messaging to improve driver compliance and ensure visibility of the messaging during winter months when pavement markings can be obstructed by snow cover. Installing these markings is a relatively low-cost treatment, though they will require annual maintenance due to snow plowing and regular deterioration.

Source:Western Transportation Institute

Temporary Speed Humps

Source: Trans Canada Traffic Inc.

A speed hump is a vertical deflection that provides a level of discomfort when driven over, requiring most vehicles to slow down significantly. They can be 8.0-10.0 cm in height and 1.0-1.8 m in width. Speed humps are applied at midblock sections of local and residential roadways and can be designed with gaps to allow emergency vehicles including fire trucks and ambulances to pass through unaffected. They are an aggressive traffic calming measure and function well at discouraging speeding downstream of their location and may also divert some vehicle traffic as they make a route less desirable for cut-through traffic. They are coupled with warning signs to alert drivers and are a fairly inexpensive traffic calming measure.

A temporary speed hump is made of plastic or rubber and is directly bolted into the pavement. They are easily removed for the winter season or roadway maintenance. They are a valuable device for pilot testing on local roadways where the effects on speeding and reaction among residents can be monitored. The option to remove them, install a permanent speed hump, or install an alternative traffic calming measure is better supported once their effects are understood after the pilot testing.

Vertical Centreline Treatment

A vertical centreline treatment consists of delineators installed along the centreline of a roadway to provide a lane narrowing effect and/or improve driver awareness of a pedestrian crossing, intersection, or other roadway feature. Like temporary speed humps, these devices must be removed in the fall to accommodate winter maintenance activities and reinstalled in the spring. Additional guidance on the use of vertical centreline treatments can be found in Section 5.3.

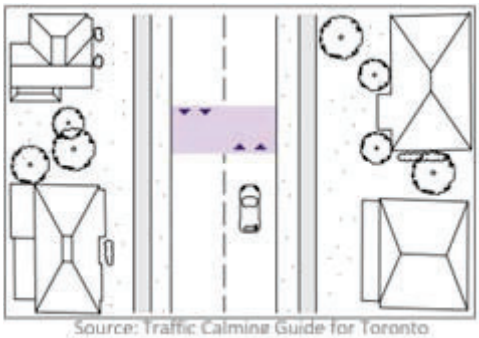
Source: TAC

4.3 LEVEL 3: PERMANENT STRATEGIES

The permanent strategies involve making significant changes to the roadway environment to influence driver behaviour. These strategies are subdivided into four categories: vertical deflection, horizontal deflection, access control, and other strategies.

4.3.1 Vertical Deflection

Vertical deflection strategies involve adding physical obstructions to the driving environment that vehicles are required to drive over. The deflections are designed to be significant enough to make it uncomfortable to drive over them at a speed higher than the desired speed for the roadway. These deflections often create challenges for cyclists, so accommodations should be made to allow cyclists to bypass the deflection where possible.



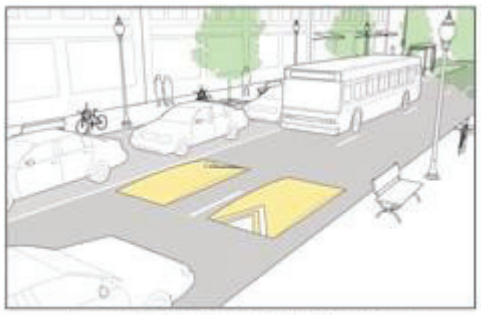
Source: Traffic Calming Guide for Toronto

Permanent Speed Humps

A permanent speed hump is a vertical deflection that provides a level of discomfort when driven over, requiring most vehicles to slow down significantly. Like a temporary speed hump, permanent speed humps are applied at midblock sections of local and residential roadways and can be designed with gaps to allow emergency vehicles including fire trucks and ambulances to pass through unaffected. They are an aggressive traffic calming measure and function well at discouraging speeding downstream of their location and may divert some vehicle traffic. Speed humps are most effective when placed in series.

A permanent speed hump is made of asphalt to resemble a raised section of pavement and typically have pavement markings. When designing speed humps, emergency service vehicles, as previously mentioned, and winter maintenance vehicles should be accommodated in the design. Drainage should also be designed for in a way where motorists cannot avoid passing the speed hump. Speed humps can become expensive during street maintenance as they must be reinstalled every time a road is repaved.

Speed Cushion



Source: Traffic Calming Guide for Toronto

A speed cushion is a vertical deflection that provides a level of discomfort when driven over, requiring most vehicles to slow down significantly. They're larger than the typical speed hump as they can be 8.0-10.0 cm in height, 2.0 m wide, and 3.5-4.0 m in length. Speed cushions are applied at midblock sections of local and collector streets. They are designed with two or more strategically placed cushions on the roadway so that emergency vehicles with a large track width (ie. fire trucks) can pass through them unobstructed but smaller passenger vehicles have to driver over the cushions. As a traffic calming measure, they function well at discouraging speeding and also divert some vehicle traffic as they make a route less desirable for cut-through traffic. They are coupled with warning signs to alert drivers and are a fairly inexpensive traffic calming measure. Speed cushions are typically made of asphalt or rubber and typically have pavement markings.

Speed Table/Raised Crosswalk

Source: NACTO

A speed table is essentially a wider speed hump that typically has a flattened top. A raised crosswalk is a speed table with an added crosswalk for pedestrians. Speed tables are less abrupt than speed humps and allow for higher desired speeds, so they are often applied at midblock sections of higher speed roadways. Similar to speed humps, speed tables are effective at enforcing speed compliance, deterring cut-through traffic, require warning signs, and require special consideration for emergency and other large vehicle traffic.

Raised Intersection

Source: Traffic Calming Guide for Toronto

Similar to a raised crosswalk or a speed table, a raised intersection elevates an entire intersection above the normal height of the roadway, improving visibility of all users at the intersection. They are not as effective as speed tables as a traffic calming measure, though they do reduce vehicle speeds through the intersection. Raised intersections are typically designed for all-way stop controlled intersection or signalized intersections, locations where drivers are already decelerating. They are often coupled with warning signs to alert drivers and textured pavement to alert visually impaired pedestrians. Emergency vehicles and transit are potentially impacted and should be considered before application.

4.3.2 Horizontal Deflection

Horizontal deflection strategies involve changing the alignment of the lanes on a roadway to narrow the roadway and, typically, require drivers to steer around obstacles in the roadway to stay in their lane. Much like the vertical deflections, these measures are designed so that most drivers would be uncomfortable driving along the road at a speed higher than the desired speed. Permanent horizontal deflections are often installed with concrete curbs and landscaping, but temporary or pilot project versions can be installed by adding barriers or other street furniture strategically to the roadway environment.

Curb Extension / Choker

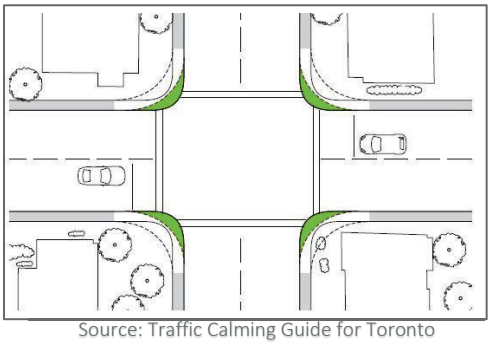
Source: Traffic Calming Guide for Toronto

Curb extensions (also known as a bulb out) and chokers are both horizontal deflections designed to protrude into the roadway and narrow vehicle lanes. They are referred to as curb extensions when installed at an intersection and as chokers when installed midblock. Vehicles are required to slow down to navigate safely through these deflections and they can have vertical break-away posts or landscaping for visibility purposes and may include sidewalk extensions.

As a traffic calming measure, curb extensions and chokers work well to enforce slower speeds. They usually provide sidewalk/midblock crossing extensions, creating a safer environment for pedestrians who become more visible and have less crossing distance at the roadway.

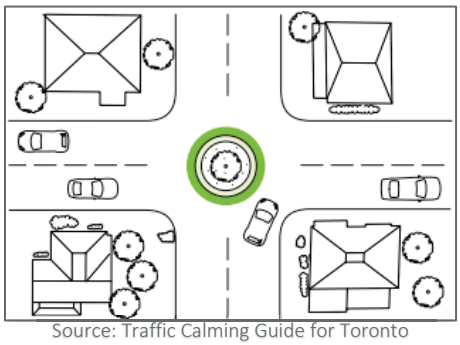
Curb Radius Reduction

An intersection with large curb radii allows right-turning vehicles to proceed through the intersection faster than at an intersection with small curb radii, so reducing the curb radii at an intersection helps to slow traffic down. This reduction also tends to decrease the crossing distances for pedestrians, reducing their exposure to traffic while crossing the intersection. Care must be taken when reducing curb radii to ensure that the largest vehicles expected to use the intersection will still be able to do so.



Source: Traffic Calming Guide for Toronto

Traffic Circle



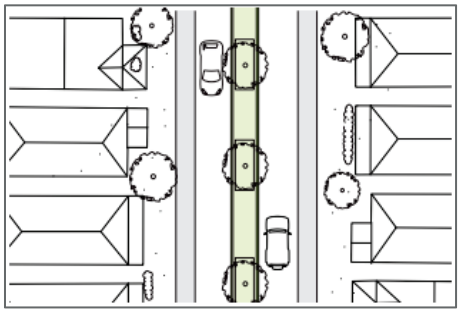
Source: Traffic Calming Guide for Toronto

A traffic calming circle is a circular element installed in the middle of an intersection to interrupt a straight driving path and reduce speeds through intersections. Traffic circles can be installed within an existing roadway but may also require reconfiguration of the intersection in addition to installing a circular median island, making it a costly measure by comparison. They are usually installed on local roadways and within neighborhoods.

As a traffic calming measure, traffic circles are effective as drivers are forced to slow down to navigate the circle and have a heightened sense of awareness of others approaching the intersection. Advanced warning signs should be installed and small impacts to emergency vehicles are expected. Consideration should be given to the design vehicle's turning path.

Raised Median Island

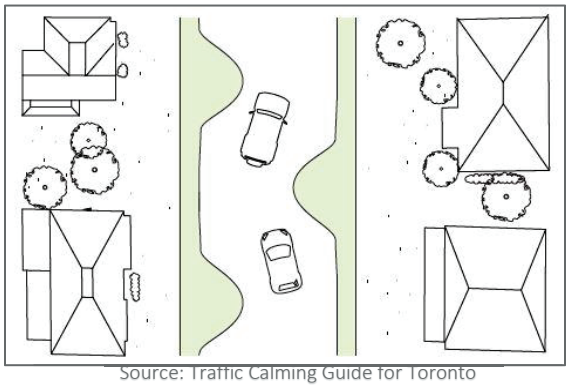
A raised median through the center of a roadway promotes slow driving by narrowing traffic lanes and can be designed as a refuge island for pedestrians if coupled with a crosswalk. Raised medians can also provide space for landscaping and improve the roadway environment. A temporary application can be used or the island can be a permanent part of the roadway design.



Source: Traffic Calming Guide for Toronto

On residential local streets, raised medians should be located to avoid impacts to driveway access. Emergency vehicles should be considered during design to ensure minimum dimensions are met in the travel lanes. Advanced warning signs should also be used to notify drivers of the upcoming traffic calming measure.

Chicane



Source: Traffic Calming Guide for Toronto

A chicane can be described as a one-sided choker and is designed to shift lanes into an "S" curve or remove one lane of travel all-together. Vehicles are required to slow down to navigate safely through the road and at times stop to allow vehicles in the opposite direction to pass at the one-lane intervals. They are often used on local streets and can be marked by curb extensions, vertical breakaway posts, or landscaping for visibility purposes.

As a traffic calming measure, chicanes work well enforcing vehicles to slow down and possibly reducing traffic volumes through the street. However, the application of chicanes has been somewhat limited in Canada due to complications with winter maintenance.

4.3.3 Access Control

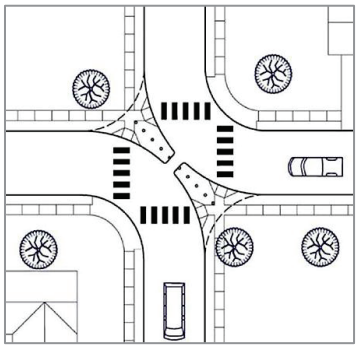
Access control strategies involve changing the traffic patterns for select intersections and roadways to limit vehicle movements and decrease the desirability of driving through the area for non-local traffic. Careful consideration and thorough engagement are required during the planning for access control measures, as they tend to also have significant impacts on the residents of the neighborhood in which they are installed. In all cases, a thorough evaluation should be undertaken to rule out other measures and evaluate the network impacts of access control strategies. Further, only vehicular access should be restricted by these controls; the design should include provisions for pedestrians and cyclists to move freely through the obstruction.

Directional Closure/Forced Turn

A directional closure or forced turn is meant to restrict left-turn and thru movements at an intersection and permit only right-in/right-out maneuvers. This restriction prevents full vehicle access and is often used at intersections between an arterial road and a local or low volume roadway. Both horizontal and vertical deflections like raised medians, vertical breakaway posts, landscaping, or striping can be used to enforce restrictions, and the deflections should be designed to discourage violators.

Diagonal Diverter

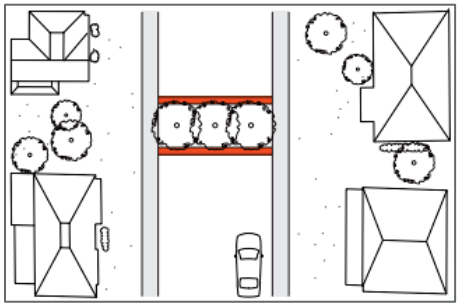
A diagonal diverter is similar to a directional closure in that it restricts thru movements at an intersection. Vertical deflections like raised curbs, breakaway posts, or landscaping are placed diagonally across a four-legged intersection to enforce restrictions while full access to pedestrians and cyclists is usually provided. This measure is best installed at low volume or local roadways.



Source: Delaware DOT

This measure will divert traffic from the thru route and only affects speeds at the intersection. It can impact access to nearby properties and can restrict emergency vehicle access. Breakaway posts or gates can be installed to allow full access to emergency vehicles.

Full Closure



Source: Traffic Calming Guide for Toronto

Full closure of a roadway is meant to restrict all access at an intersection and is reserved for local roadways. Usually vertical deflections like a raised median, walls, or landscaping are used to enforce restrictions.

This measure will divert all traffic from this route and will not necessarily affect vehicle speeds. It can impact access to nearby properties and emergency vehicles. This measure is usually made permanent and should be a last resort to solve a traffic volume problem. Consideration should be made for the turnaround of snowplows, garbage trucks and other service vehicles.

4.3.4 Other

In addition to strategies that focus on deflections and access control, a variety of other strategies can be implemented to calm traffic through an area.

Complete Street

A complete street is an all mode encompassing approach to the standard vehicle centric roadway. Roadway geometry is optimized to support vehicles safely traveling along side cyclists, pedestrians, and transit. Complete streets are often signed at lower speeds to match the behaviour of drivers due to the constrained dimensions. Complete Streets are becoming a popular solution in urban cities as vehicle travel is becoming less practical and expensive, especially through downtown corridors. Complete streets are best applied as part of a network plan that considers pedestrian and cyclist connectivity, as well as transit routes, to better service all modes.

The cross-section of a complete street can feature spacious sidewalks, parking lanes, protected cycle tracks, transit lanes, and one vehicle lane in each

direction depending on the objective and functionality of the street. The included figure is an example of a before and after street layout where the complete street application shares roadway space with vehicles, cyclists, and pedestrians and includes curbside management with on-street patios and parking when possible. Green space is also added to enhance the roadway experience.

Pavement Surface Treatment

Specialized pavement surface treatments call a driver's attention to their surroundings and may include the application of colored asphalt, textured brick, or cobblestones. These features are meant to alert the driver of a change in environment and to slow down. Cyclists and pedestrians are often integrated and made the priority mode through these sections through the addition of dedicated space for these modes. Pavement surface treatments have a positive visual effect but may cause additional noise if textured pavement is used. Consideration should be given for wheelchair accessibility, bikes, and snow clearance equipment. All pavement surface treatment designs should be in compliance with the *Manual for Uniform Traffic Control Devices for Canada* (MUTCDC) published by TAC.

5 SPECIAL CONSIDERATIONS

In addition to the traffic calming policy detailed above, the Study Team was asked to provide guidance on the use of all-way stop intersections, children-at-play signs, and portable speed display signs.

5.1 ALL-WAY STOP INTERSECTIONS

All-way stop intersections are not a traffic calming measure. The purpose of all-way stop intersections is to balance the travel right-of-way at an intersection between two roads with relatively equal volumes of traffic. All-way stop control should only be used at intersections when warranted by:

- High traffic volumes on the minor road;
- Even distributions of traffic on the various approaches;
- Excessive delays on the minor road; and/or
- A high volume of turning or right angle collisions.

Unwarranted installation of all-way stop intersections can lead to challenges with driver compliance, increased vehicle-vehicle and vehicle-pedestrian conflicts, and an increase in mid-block speeds. Mid-block speeds have a demonstrated tendency to increase as drivers attempt to make up the time lost at the intersection. Additionally, unwarranted all-way stop intersections can give pedestrians a false sense of security as drivers tend to roll through the intersection instead of coming to a full stop.

The TAC Manual of Uniform Traffic Control Devices for Canada (MUTCDC) indicates that All-Way Stop signs may be warranted under one or more of the following conditions:

a) Where the traffic volumes on the intersecting roads are approximately equal, and the combined pedestrian and vehicular volumes on the minor road average 200 per hour for an eight-hour period;
b) Where the average delay to the minor road vehicular traffic entering the intersection exceeds 20 seconds per vehicle during the peak hour;
c) Where traffic signals are not warranted, and a collision problem exists, as indicated by five or more reported collisions per year of a type which may be prevented by an All Way Stop sign installation. Such collisions include right and left turn collisions as well as right angle collisions;
d) As an interim measure prior to the installation of traffic signals; or
e) As in interim measure, for a period of approximately one month prior to switching the stop control from one road to an intersecting road, and the subsequent removal of existing stop signs on the first road.

5.2 CHILDREN-AT-PLAY SIGNS

Children-at-play signs, an example of which is shown to the right, are only effective at increasing driver attention and reducing vehicle speeds when used in very limited circumstances. While installing these signs may cause an initial increase in driver attention in their vicinity, as drivers pass more of these signs without any children being present the intended effect wears off rapidly. When further considering that children could be playing on most neighbourhood roads in the Town, the sheer number of these signs that would be required to sign every local road would greatly dilute their impact.

Source: Precision Sign Catalogue

The MUTCDC does not include a children-at-play sign and, therefore, provides no guidance on their installation; however, it does include a Playground Area sign, as shown to the right. The MUTCDC indicates that this sign *"is used to indicate sections of roads adjoining public playgrounds, where the presence of children on, or near the road, would represent and intermittent hazard to the driver."* Further guidance on the installation of these signs can be found in the *TAC School and Playground Areas and Zones: Guidelines for Application and Implementation*. It is recommended that children-at-play signs not be installed in the Town of Shediac but that playground ahead signs can be installed following the guidance from TAC, if desired.

Source: MUTCDC

5.3 VERTICAL CENTERLINE TREATMENT

A vertical centerline treatment is a form of traffic calming which gives the impression of lane narrowing by creating a type of center median that heightens driver awareness. A vertical delineator is installed at the centerline of a roadway to reduce vehicle speeds and can reduce collisions due to the separation in traffic. They are often used on local and collector streets. Usually a flexible post-mounted sign, as shown in the figure to the right, is installed. Some wider vehicles may have trouble navigating around them which makes their collapsible design ideal for withstanding impacts from vehicles. They can be installed at a very low cost but can require frequent replacement depending on the severity of impacts. They are used seasonally and removed in winter months to accommodate snow plows.

Source: City of Fredericton

Source: City of Fredericton

For urban settings, vertical centerline treatments are used on two-lane two-way roadways. At unsignalized crosswalks, they can be placed on the centerline before crosswalks to notify vehicles of pedestrians crossing the road.

The City of Fredericton is currently running a pilot project of vertical centreline treatment installations at five trail crossings in the City, with a greater desire to promote driver awareness of the trail crossing than to reduce vehicle speeds. These pilot installations are intended to be temporary until raised medians can be installed to improve pedestrian safety and mobility. The City also uses vertical

centerline treatments at one all-way stop control intersection to increase driver awareness of the stop signs. The City's experience with their application has been positive overall. The City has heard less neighborhood complaints and the flexible posts have been resilient to impacts, however no field data has been recorded to prove their effectiveness. Maintenance requirements for installing, removing, maintaining, and storing the signs were described as an inconvenience.

The City of Moncton and City of Dieppe have also recently installed vertical centerline treatments. The City of Moncton purpose for installing them was to prevent vehicles from circumventing a single painted through lane often misused and they did not prove to be effective. Additionally, they were used to separate a bike lane in past, but no data supports their success or failure. There was an opportunity to use vertical centerline treatments for a pilot one-way temporary bike lane on Main Street during the summer but in the end, the City decided they were too much effort for a temporary bike lane and they would not provide safety for the cyclists. The City of Dieppe has begun installing them at crosswalks with little interference to driveway accesses and feel they've slowed traffic, though no data was recorded to support this. The City of Dieppe have made them seasonal and removes them in the winter for snow plowing convenience.

5.4 REDUCED SPEED LIMIT ZONES

A reduced speed zone is a section of roadway signed at a lower speed than the other section of roadway. A reduced speed zone is typically a low cost and low effort response as it only requires sign installation along the roadway. Reduced speed zones are often used for school zones, dense urban areas, or city limits in rural areas.

A technical engineering analysis is required to apply a reduced speed zone. The 85th percentile speed, which is the speed that 85 percent of vehicles are recorded as driving slower than on a stretch of roadway, must be defined before recommending a change in the speed limit. Proper placement of the new posted speed limit and advanced warning signs should be determined as well. Refer to the *TAC Guideline for Establishing the Posted Speed Limit* for when to appropriately reduce a roadway speed limit. If attempting to implement a reduced speed limit, it would be beneficial to incorporate portable speed display signs into the new area to pilot and evaluate the effectiveness of the reduced speed limit before making it a permanent change.

Simply reducing the speed limit on a roadway does not often result in reduced driver speeds. Most drivers will drive at a speed that they feel is comfortable to them regardless of the posted speed limit and therefore most traffic calming strategies focus on making the roadway less comfortable to reduce speed. Some drivers may choose to drive at the new posted speed limit, but this creates new safety challenges due to a wider range of speeds that vehicles will be travelling at along the roadway. Additionally, law enforcement will be burdened with an increase in violators.

Also note that, according to the *Provincial Motor Vehicle Act* (MVA), no vehicle shall drive over 50 km/h in an urban district unless otherwise signed. Local traffic authorities are permitted to prescribe a higher or lower speed limit than the typical 50 km/h speed limit on urban roadways within jurisdictional boundaries. A by-law is required to make the speed limit enforceable within a local authority's jurisdiction.

5.5 APPLICATION OF RADAR SPEED DISPLAY SIGNS

Radar speed display signs capture the speed of an approaching vehicle using radar technology and report that speed on a digital display. Speed signs can be used to promote better compliance with posted speed limits and for speed and volume data collection. Radar speed signs can be used in permanent or temporary applications. Permanent radar speed signs are most often applied in locations such as school zones or

speed transition zones. Temporary or portable radar speed signs are typically used for short term data collection or as a temporary traffic calming strategy to raise driver awareness of speeds. The applications of radar speed signs are discussed below along with a recommended speed monitoring program for the Town of Shediac.

5.5.1 Permanent Radar Speed Display Signs for Traffic Calming

Permanent radar speed signs are mounted in a fixed location and have been found to be effective in achieving sustained reductions in travel speeds under certain conditions. Their primary application in New Brunswick is within school zones, but they are also used in speed transition areas and other special circumstances (e.g. playgrounds). Permanent speed display signs are not widely used for routine neighbourhood traffic calming as it is generally recommended to limit their use to specific circumstances (like school zones) to maximize their effectiveness. For example, the New Brunswick Department of Transportation and Infrastructure has a policy to limit the use of permanent radar speed signs on provincial roads to School Zones only, subject to an engineering review.

5.5.2 Temporary Radar Speed Display Signs for Traffic Calming

It is becoming common for municipalities to use portable radar speed signs for short term applications in data collection and traffic calming on neighbourhood streets. For traffic calming applications, the signs operate in active mode (reporting driver speeds on screen) and are mainly intended to raise driver awareness of speeds. In routine neighbourhood applications, the signs may not achieve meaningful reductions in speeds if there was not already a large discrepancy between existing travel speeds and the posted speed limit. It is also unlikely that any speed reductions would be sustained long after the signs are removed.

For data collection purposes, the signs can operate in active mode or stealth mode. For collecting baseline speed information, it is useful to operate the signs in stealth mode so that driver behaviour is not impacted by the signs. Further guidance on operating radar speed signs for speed monitoring purposes is provided below.

5.5.3 Speed Monitoring using Portable Radar Speed Signs

The Town of Shediac owns two Traffic Logix portable radar speed signs. The Town has used these signs to collect speed data on local streets in response to specific speeding concerns from the public, but is seeking to have a more structure approach to deploying the signs. The following provides guidance on the sign placement, study duration, and use of the data in the context of the proposed Traffic Calming Policy:

Data Collection Schedule

- Based on the Town's current internal resources, it would be reasonable to plan for five speed studies per year. A schedule should be prepared in the Spring to identify the streets/locations to be monitored and the scheduled dates. Care should be taken to avoid construction or special events that could impact travel speeds.

Data Collection Duration

- At each location, it is recommended to collect data continuously for a minimum of 3 weekdays, although a period 1 week is desirable if schedules allow it. In some cases, weekend data collection may be desirable (e.g. to capture tourism impacts or adjacent to recreational facilities).

Sign Placement

- Place one sign on each side of the road so that both directions of travel are captured;
- Place signs a minimum of 100m from intersections, crosswalks, sharp curves, or other conditions that may impact free flow driving speeds;
- Install signs within 1.5m of the roadway with the sign facing perpendicular to the roadway and the radar facing oncoming traffic for best results;
- Before installing speed displays, check for any obstructions such as trees, utility poles, and signage that may interfere with the radar.

Data Extraction and Analysis

- Data may be extracted in raw form or may be reported with a summary of key statistics such as traffic volume, average speeds, 85th percentile speeds, and percentage of vehicles travelling above the speed limit. Raw form data allows for further analysis such as speed distribution graphs and other custom statistics that can provide a more thorough understanding of speed behaviour.
- Any unusual conditions that occurred during the data collection period such as severe weather, construction or roadway incident should be noted. Data recorded during such conditions should be removed from the dataset or the data collection repeated to avoid skewing of the data.
- A brief report should be produced that includes a map of the Study Area, the location of the signs, and the dates deployed. The report should outline the summary statistics, and provide commentary on compliance with the posted speed and recommendations for next steps.
- Typically, the key statistics to focus on are the 85th percentile speed and average speed (in each direction of travel). As a general rule, an 85th percentile speed that is equal to or less than the posted speed limit indicates very strong compliance with the posted speed limit. This situation shows little evidence of the need for traffic calming. An 85th percentile speed within 10% of the posted speed limit can be characterized as moderate compliance, while 85th percentile speeds that are >10% higher than the posted speed limit indicates fair to poor compliance. The two latter cases may suggest the need for traffic calming, but should be prioritized using the prioritization tool presented in this Traffic Calming Policy.
- The study results should be logged in a database or inventory that lists the location, data collection dates, 85th percentile speed, average speed, and traffic volume for each travel direction. The prioritization score should also be logged.
- The prioritization results should be used to select which locations to advance for traffic calming plan development. This will help focus resources and any capital expenditures where action is most needed.

Appendix A: Prioritization Ranking Examples

OVERVIEW

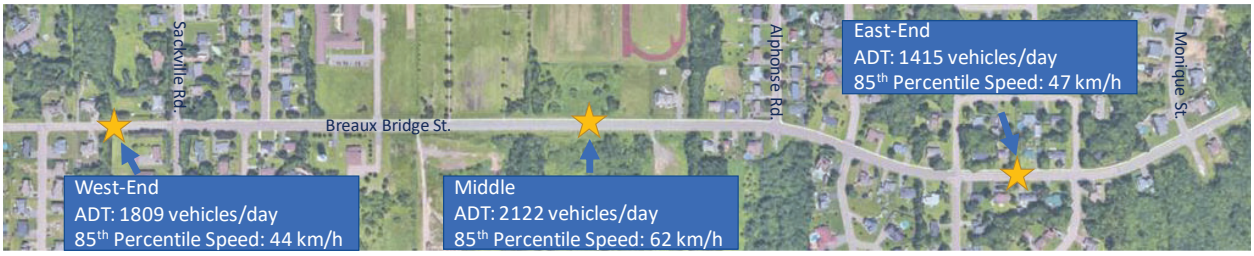
To demonstrate how to apply the prioritization ranking criteria, case studies were carried out using speed and traffic data from Breaux Bridge Street. For reference, the table with the ranking criteria (Table 4) is duplicated below. No collision data was available for these case studies, so it was assumed that there were no relevant collisions in the previous 3 years.

PARAMETER	CRITERIA	MAX POINTS
85th Percentile Speed	**1 point** for every km/h that the 85th percentile speed is between 1-10 km/h over the posted speed limit, plus **2 points** for every km/h that the 85th percentile speed is between 10-20 km/h over the posted speed limit	30
Traffic Volume (ADT)	*Local roads:* **1 point** for every 50 ADT over a minimum of 500 *Collector roads:* **1 point** for every 100 ADT over a minimum of 1000	30
Collisions	**2 points** for every collision in the previous three years in the study area involving a vulnerable road user (i.e. pedestrian, cyclists)	10
Pedestrian Generators	**5 points** for every pedestrian generator within the study area (playground, senior's center, community centre, school, retail, trail, etc.)	15
Pedestrian Facilities	**15 points** for streets with no pedestrian facilities	15

BREAUX BRIDGE STREET

Breaux Bridge Street is a 50 km/h roadway in Shediac that runs perpendicular to the main direction of local roads on the south end of the Town. Breaux Bridge Street functions as a minor collector street, providing access to connecting residential local streets and providing east-west traffic movement as an alternative to Main Street.

85th percentile speed and traffic volume data were provided by the Town at three locations along Breaux Bridge Street as shown in the figure below. ADTs represent the two-way average weekday traffic volume The 85th percentile speed is the approximate average between eastbound and westbound vehicles across the provided data.



85th Percentile Speed

The east- and west-end locations both had 85th percentile speeds under 50 km/h, so these locations both earn 0 points for the ranking score. The middle location had an 85th percentile speed of 62 km/h, which

was 12 km/h in excess of the speed limit. This results in the middle location earning 14 points for the ranking score as calculated below:

$$\left[10\,km/h * 1\frac{point}{(km/h)}\right] + \left[2\,km/h * 2\frac{points}{(km/h)}\right] = 14\,points$$

Traffic Volume (ADT)

The ADT for each of these locations exceeds the 1000 vehicle/day minimum for collector roads, so each of these locations earns points based on traffic volume. The east-end earns 4 points, the middle earns 11 points, and the west-end earns 8 points, as detailed below.

East-End: $\frac{(1415\,vehicles/day - 1000 vehicles/day)}{100\frac{vehicles/day}{point}} = \frac{415}{100} = 4.15 \cong 4\,points$

Middle: $\frac{(2122\,vehicles/day - 1000 vehicles/day)}{100\frac{vehicles/day}{point}} = \frac{1122}{100} = 11.22 \cong 11\,points$

West-End: $\frac{(1809\,vehicles/day - 1000 vehicles/day)}{100\frac{vehicles/day}{point}} = \frac{809}{100} = 8.09 \cong 8\,points$

Collision History

As indicated previously, collision data were not available for this case study. Had it been available, any collision involving a vulnerable road user (eg. a pedestrian or cyclist) in the study area would have earned the location an additional 2 points up to a maximum of 10. As no data were available, each location was given 0 points for this category.

Pedestrian Generators

Reviewing the areas on Google Earth, there did not appear to be any pedestrian generators (trails, schools, community centres, etc.) near any of these study areas. The middle location is close to the sports facilities for École Polyvalente Louis-J.-Robichaud, but there did not appear to be a significant pedestrian connection between the school and Breaux Bridge Street, so the school was not counted. As a result, each location earned 0 points for this category. Had the school counted as a pedestrian generator, the middle location would have earned 5 points.

Pedestrian Facilities

A sidewalk is located on the north side of Breaux Bridge Street through the middle and east-end segments but no pedestrian facilities are provided in the west segment. As a result, the middle and east-end locations earned 0 points for this category and the west-end location earned 15 points, due to the lack of pedestrian facilities.

Results

As shown in the Table below, the middle section scored the most points (25) and is therefore the highest priority location for traffic calming, followed by the west-end with 23 points. The east-end only scored 4 points, which is lower than the 20-point threshold, so the traffic conditions do not indicate a need for traffic calming in this area. Based on these results, the Town could proceed with plan development at the middle and west-end locations in order of priority based on the scoring and budget constraints. The scoring indicates that the middle segment is the highest priority for plan development. It is also useful to use the scoring tool to understand what factors contributed to the score. For example, although the west segment

scored 23 points, the highest contributing factors were the traffic volume and lack of pedestrian facilities. Excessive speeding was not a factor. Therefore, the Town may focus efforts on improving conditions for pedestrians as a priority action.

PARAMETER	WEST-END		MIDDLE		EAST-END	
	Value	Points	Value	Points	Value	Points
85th Percentile Speed	44 km/h	0	62 km/h	14	47	0
Traffic Volume (ADT)	1809 veh/day	8	2122 veh/day	11	1415 veh/day	4
Collisions	N/A	0	N/A	0	N/A	0
Pedestrian Generators	None	0	None	0	None	0
Pedestrian Facilities	None	15	Available	0	Available	0
Total		**23**		**25**		**4**