



City of Greater Sudbury

**DEVELOPMENT OF TRAFFIC CALMING POLICY & PILOT
PROJECT REVIEW FOR SOUTHVIEW DRIVE / BOUCHARD
STREET
TRAFFIC CALMING WARRANT**

TECHNICAL MEMORANDUM #2

OCTOBER 2008



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1. INTRODUCTION

City of Greater Sudbury staff receive numerous requests each year for traffic calming features such as speed humps, curb extensions and raised intersections. The city currently has no process for responding to traffic calming requests. IBI Group has been retained by the City of Greater Sudbury to develop a traffic calming policy, including a warrant and prioritization process, which will aid City staff in the evaluation of these requests and the application of traffic calming devices.

1.1 Study Background and Objectives

The need and justification for traffic calming and remedial measures varies considerably from one jurisdiction to the next, and in response, a number of jurisdictions have developed their own traffic calming 'warrants' based on traffic/pedestrian volumes, operating speeds, collisions/conflicts and a number of other factors. Much like traffic signal warrants, traffic calming warrants provide guidance for the appropriateness and implementation of traffic calming measures. In most cases, traffic calming warrants were developed to quantify the problems and complaints that residents raise in their traffic calming requests. In many jurisdictions, the warrants go beyond a simple minimum score required for traffic calming and also offer a means to rank or prioritize potential traffic calming sites through secondary evaluation criteria.

The overall objective of this study is to develop a formal traffic calming policy for the City of Greater Sudbury. This policy will detail the goals and objectives of traffic calming, the planning process and a list of acceptable measures with guidelines for their implementation.

Sudbury's policy will contain its own traffic calming warrant that will allow the city to score, rank and prioritize traffic calming requests. This process will quantify the perceived problems and ensure that all sites are evaluated against the same set of criteria and that traffic calming measures can be applied first and foremost to those locations that receive the highest scores.

1.2 Report Overview

This document builds on a Best Practices Report (submitted by IBI Group to Sudbury in May 2008), assessing the practices of other jurisdictions, and develops a traffic calming warrant that provides appropriate guidance for the implementation of traffic calming measures in the City of Greater Sudbury. The warrant methodology consists of two primary steps, namely:

1. Initial screening; and
2. Scoring and ranking.

The overall traffic calming process, from initial public request to Council approval and implementation, is a six-step process that will be described in detail in the traffic calming policy prepared for Task 4 of this assignment. **Section 3** of this report describes the screening, scoring and ranking methodology in detail.

In order to determine the effectiveness of the warrant, a pilot test was conducted with traffic data supplied by the City. Part of the intent of a traffic calming warrant, much like a traffic signal warrant, is to strike a balance whereby the chosen criteria is stringent enough that some requests for traffic calming will be denied, yet lenient enough that some requests will qualify. Simply put, the warrant is ineffective if it creates an all or nothing situation. The purpose of this testing, discussed in **Section 4**,

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is therefore to ensure that the developed warrant strikes this balance between no/few pilot test sites meeting the criteria and most/all of the sites meeting them.

Finally, IBI Group has developed spreadsheet tools to assist the City in the screening and evaluation process. The first tool creates an individual file for each candidate site and scores the site based on the warrant criteria discussed within this report. A separate tool aggregates the individual sites into a summary report for City use. The spreadsheet tools are discussed in **Section 5**.

1.3 List of Terms and Acronyms

The following is a list of acronyms and ‘technical’ or otherwise ambiguous terms used in this report, presented for the readers’ convenience:

- **85th Percentile Speed** – The speed separating the fastest 15% of vehicles from the slowest 85%;
- **ADT** – Average daily traffic, recorded over a 24-hour period;
- **Cut Through Traffic** – Traffic determined to neither begin nor end a trip within a defined study area. Typically synonymous with “non-local traffic”;
- **EMS** – Emergency medical services;
- **FSA** – Forward Sortation Area; the first three characters of a postal code;
- **Local Road, Collector, Tertiary Arterial** – Three of the roadway classifications used by the City of Greater Sudbury, in increasing order of volume and importance within the overall roadway network;
- **MTO** – Ontario Ministry of Transportation;
- **OTM** – Ontario Traffic Manual;
- **Pedestrian Facilities** – Sidewalks;
- **Pedestrian Generators** – Schools, parks, etc to be defined by Sudbury; and
- **VPD** – Vehicles per day.

2. PUBLIC CONSULTATION PROCESS

Rather than hold public meetings for the traffic calming warrant and policy, IBI Group developed online survey materials requesting public input on the warrant criteria. A link to the survey was posted to the City of Greater Sudbury’s new traffic calming website¹, and hard copies of the survey were also distributed to Citizen Service Centres. Additionally, the City of Greater Sudbury and IBI Group held two public meetings for the Southview Drive / Bouchard Street pilot project component of this study. The citywide traffic calming policy surveys were distributed at these meetings, along with Southview Drive-specific surveys, and the website was discussed.

¹ http://www.greatersudbury.ca/cms/index.cfm?app=div_transportation&lang=en&currID=7783&parID=0

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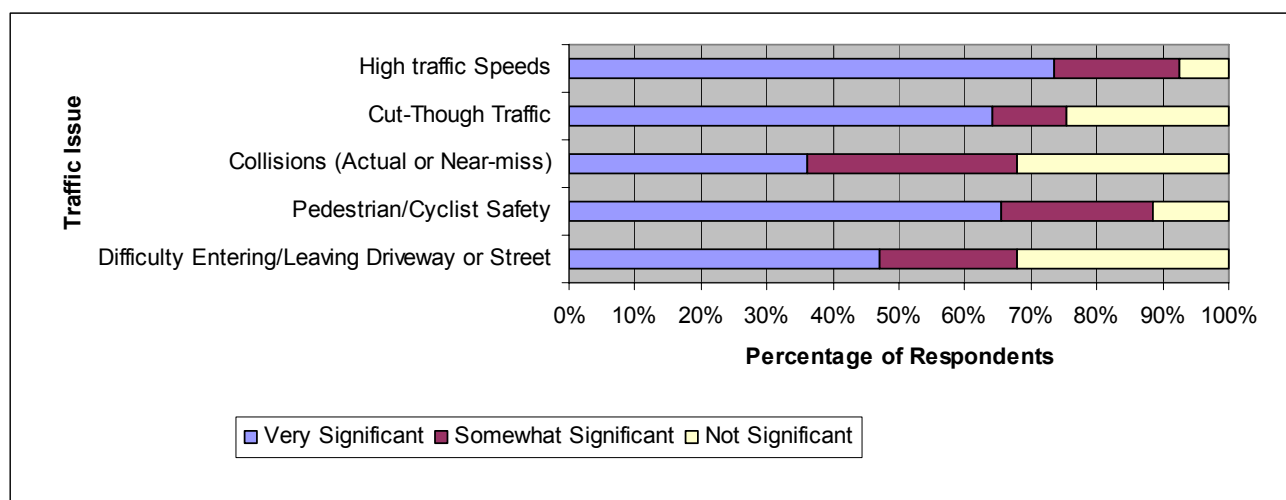
The citywide survey was used to assess the public's familiarity with traffic calming, as well as gain an understanding of which factors are most important to city residents. The survey responses and comments received at the meeting were used as additional inputs into the warrant development.

57 residents responded to all or part of the survey. Detailed survey results are included in **Appendix A**. The survey results are unedited except for format and removal of respondents' personal information. It will be seen when reviewing the survey responses that a large number of the respondents are from the Southview Drive community, and the responses in many cases reflect their particular concerns. While a higher response rate was originally anticipated, the survey responses were consistent with expectations. In general, the responses indicate:

- High traffic speeds and non-local volume are seen as the two most significant traffic issues;
- Pedestrian and cyclist safety is also very important to Sudbury residents;
- Many respondents have difficulty entering or exiting their driveways;
- General unfamiliarity with traffic calming devices, given the lack of such installations in Sudbury;
- Desire to implement traffic calming if it offers a solution to concerns; and
- Common misconceptions concerning some traffic calming devices.

Responses to three of the questions are illustrated below. **Exhibit 2-1** shows that respondents place high significance on each of the five traffic issues presented for consideration. As expected, high traffic speeds scored the highest on the survey, while cut-through traffic and pedestrian/cyclist safety were in a near tie for second place.

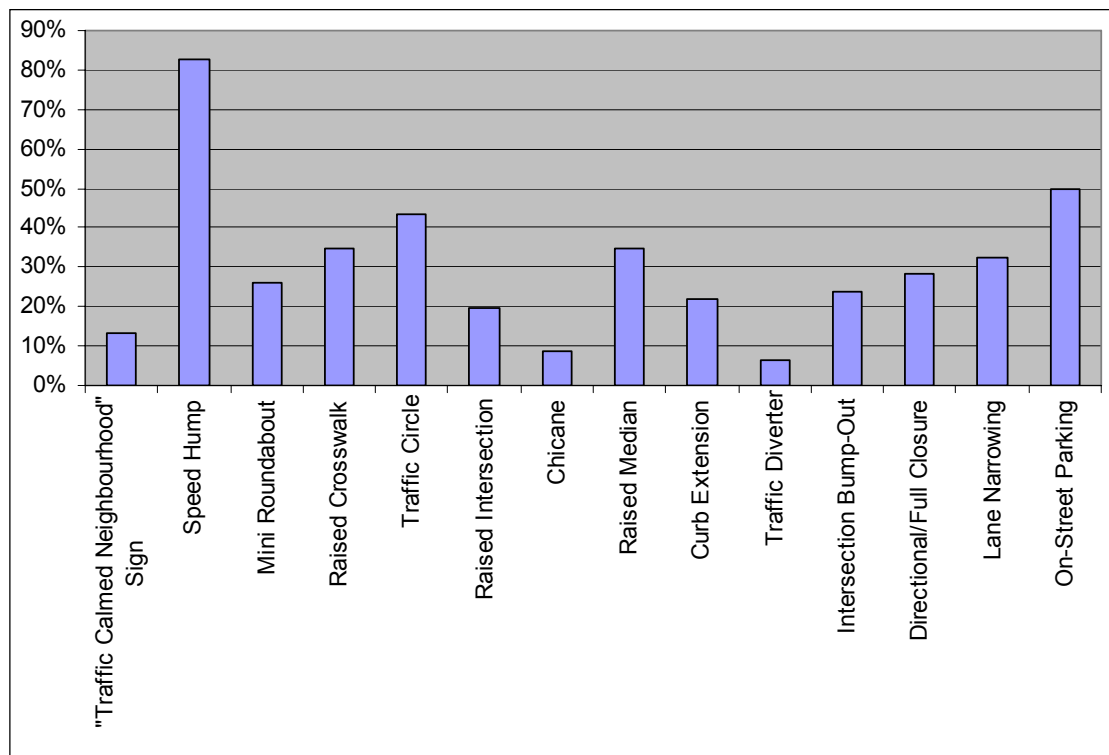
Exhibit 2-1: Survey Response: Significance of Traffic Issues



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Respondents were asked to state which traffic calming devices they have experienced, either in Sudbury or elsewhere. As shown in **Exhibit 2-2**, it is unsurprising that respondents are most familiar with speed humps and least familiar with those devices that are either lesser used or have technical names, such as chicanes and traffic diverters.

Exhibit 2-2: Survey Response: Experience with Traffic Calming Devices



Finally—and pertaining directly to the warrant process—respondents were asked to rank the traffic calming criteria that was under consideration for the warrant. The sample size for this response is smaller than for the other questions, as a number of respondents who filled out surveys by hand misinterpreted the question, and their responses were discarded. **Exhibit 2-3** is based on 22 surveys (not all respondents ranked each criteria) and shows that traffic speeds were ranked the number one criteria by 50 percent of respondents, and within the top three criteria by all but one respondent. The results show that other traditional criteria such as traffic volumes and pedestrians are generally important to respondents. The results were mixed when it came to criteria such as residential consultation/support, transit services and collision history, with some respondents ranking the criteria very high and others ranking them very low.

Exhibit 2-3: Survey Response: Traffic Calming Criteria Ranking

Criteria	<div style="display: flex; justify-content: space-between; align-items: center;"> Most Important ➔ Least Important </div>									
	1	2	3	4	5	6	7	8	9	10
Traffic Speeds	50%	19%	25%	---	---	---	6%	---	---	---
Traffic Volumes	24%	29%	---	29%	18%	---	---	---	---	---
Residential Consultation and Support	13%	7%	---	---	---	20%	13%	13%	20%	13%
Emergency Services and Routes	13%	7%	7%	7%	20%	20%	13%	7%	7%	---
Pedestrian Generators and Facilities	13%	19%	19%	6%	25%	6%	13%	---	---	---
Cut-Through Traffic	7%	7%	14%	21%	21%	---	7%	---	7%	14%
Transit Services and Routes	12%	---	18%	12%	6%	12%	---	18%	12%	12%
Collision History	---	15%	23%	15%	---	8%	23%	8%	8%	---
Road Classification and Grade	---	---	8%	8%	17%	---	25%	25%	8%	8%
Adjacent Land Uses	---	---	8%	8%	---	15%	---	23%	8%	38%

3. TRAFFIC CALMING WARRANT METHODOLOGY

The two-part screening and ranking process is part of a larger six-step framework recommended for traffic calming requests, as shown in the following list:

1. Request for Traffic Calming;
2. **Traffic Calming Screening Process;**
3. **Evaluation Scoring and Ranking;**
4. Available Traffic Calming Measures;
5. Project Selection and Council Study Approval; and
6. Design, Final Approval, Implementation.

Appendix B contains a flowchart of the entire framework, which will be discussed in full detail in the Traffic Calming Policy deliverable of this assignment.

3.1 Traffic Calming Screening Process

Step 2 of the overall process is the first of two warrant steps, an initial screening process undertaken by City staff. The screening process sets requirements in five areas. A combination of these requirements must be met for a site to be eligible for traffic calming. **Exhibit 3-1** defines the screening criteria and associated thresholds. Screening criteria are tailored to local and Collector/Tertiary Arterial streets, each of which have different functional characteristics.

Exhibit 3-1: Criteria and Thresholds

Criteria	Threshold		Notes
	Local Road	Collector / Tertiary Arterial	
Grade	< 8%		If the grade is equal to or greater than 8%, traffic calming is not permitted
Collision History	≥ 6	≥ 12	Number of collisions within the last three years involving vulnerable road users and/or which could potentially be corrected by traffic calming measures
Volume	≥ 900 vpd	≥ 3,000 vpd (Collector) ≥ 5,000 vpd (Tertiary Arterial)	Two-way ADT volume
Speeds	≥ posted speed limit		85 th percentile speed
Non-Local Traffic	≥ 30%		'Cut-through traffic'

The screening can be summarized as follows:

- **Grade:** if the grade of the roadway is equal to or greater than the maximum threshold of 8%, then traffic calming is not permitted on the roadway at all. This is consistent with other jurisdictions and is due to the fact that traffic calming devices implemented on steep grades could cause safety concerns.
- **Collision History:** if the number of collisions within the past three years involving vulnerable road users (primarily pedestrians and cyclists) and/or which could be potentially corrected by traffic calming measures is equal to or greater than the minimum threshold, then the volume, speed and non-local traffic requirements do not need to be met, and the site moves directly to the ranking process.

Tertiary Arterials and Collectors are required to have 12 collisions to satisfy this component of the warrant and bypass the volume, speed and non-local traffic requirements. This value is midway between the number of collisions within the past three years required to satisfy OTM Book 5 criteria for all-way stop signs (three or more right angle or turning collisions per year over a three year period) and former OTM Book 12 criteria for traffic signals (five 'correctable' collisions per year over a three year period)², and has been used by IBI Group in the past for traffic calming applications. The minimum threshold was also set high enough so that relatively few sites will be expected to qualify for traffic calming measures on the basis of collisions alone.

Given the difference in minimum volume thresholds for local roads compared to collectors, a minimum of 6 collisions within the last three years was accordingly selected as the threshold. This is consistent with the City of Greater Sudbury's own all-way stop control warrant, which requires an average of two collisions per year over a three year period.

² The November 2007 update to OTM Book 12 has since changed the collision signal warrant from raw 'correctable' collisions to a collision severity index.

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Collision statistics are often recorded as a rate, expressed as collisions per million vehicles entering an intersection, or collisions per million vehicle-kilometres for a roadway segment. Given that the collision criteria of the traffic calming warrant is only intended to address a specific subset of collisions, raw numbers are preferable to a rate.

- **Speeds and Non-Local Traffic:** at least one of these must meet the minimum threshold for further consideration; and
- **Volume:** regardless of speed and percentage of non-local traffic, the minimum volume threshold must be met. Only a high frequency of collisions can qualify a site for traffic calming without meeting the volume threshold. It is recognized that there may be roads that have very high speeds, but do not meet the volume criteria, and therefore do not qualify for traffic calming under the formal warrant process. Rural roads would be most likely to fall under this category. For these roads, it may be appropriate to implement other solutions, such as speed enforcement or Sudbury's Speed Watch Program. Changes to a rural road's design may also be warranted in some situations.

Exhibit 3-2 graphically represents the screening process, while **Exhibit 3-3** shows the possible scenarios that can arise from application of this screening process.

Exhibit 3-2: Step 2: Screening Process

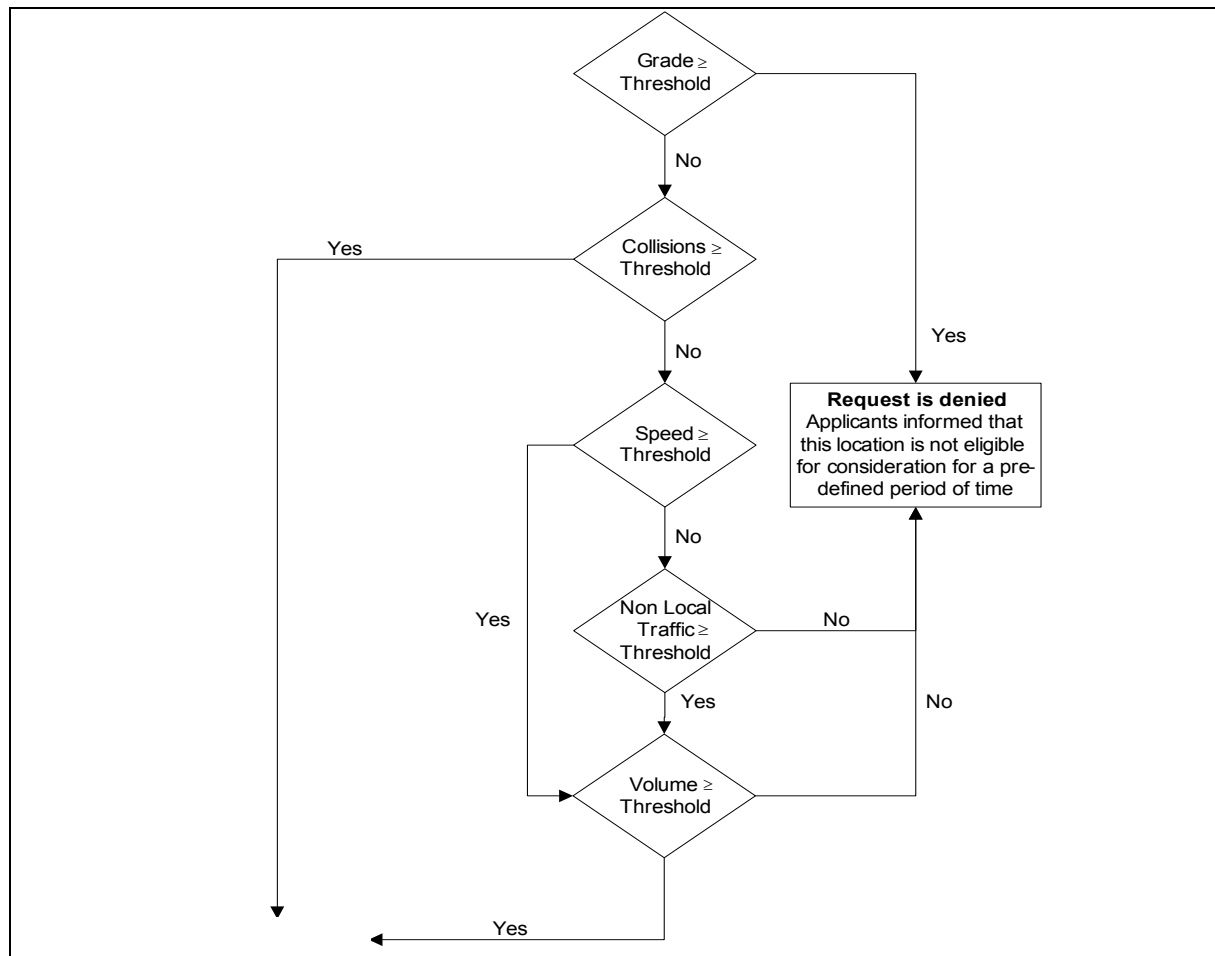


Exhibit 3-3: Possible Screening Scenarios

Scenario	Grade	Collisions	Speed	Non-Local	Volume	Result
1	≥ Max	Any	Any	Any	Any	Not eligible for traffic calming
2	< Max	≥ Min	Any	Any	Any	Eligible; continue evaluation
3	< Max	< Min	≥ Min	Any	≥ Min	Eligible; continue evaluation
4	< Max	< Min	Any	≥ Min	≥ Min	Eligible; continue evaluation
5	< Max	< Min	Any	Any	< Min	Not eligible for traffic calming

3.2 Evaluation Scoring and Ranking

Sites that pass the initial screening are then ranked against each other in Step 3. The evaluation, scoring and ranking process incorporates 10 criteria, established through discussions between IBI Group and the City of Greater Sudbury, with appropriate weighting applied to each. Each eligible traffic calming request is awarded points based on its score for each factor, with a maximum score of 100 points. Based on an objective analysis of the evaluation scoring, a score of 30 points has been established as a minimum threshold to qualify for traffic calming consideration.

3.2.1 SCORING

A separate evaluation of Local Roads and Collectors/Tertiary Arterials is recommended due to the intended function of each road classification, including transit service and emergency services needs. **Exhibit 3-4** and **Exhibit 3-5** show the scoring for Local Roads and Collectors/Tertiary Arterials, respectively.

Exhibit 3-4: Scoring: Local Roads

Factor	Point Criteria	Maximum Points
Collision History	4 points for each qualifying collision in the past three years	20
Traffic Speeds	1 point for each km/h above posted speed	15
Non-Local Traffic	3 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	15
Traffic Volumes	1 point for each 50 vehicles above 900	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	5 points if there are no sidewalks in the study area	5
Emergency Services and Routes	-4 points if the study area is a primary EMS route	0
Transit Services and Routes	-2 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

Exhibit 3-5: Scoring: Collectors and Tertiary Arterials

Factor	Point Criteria	Maximum Points
Collision History	3 points for each qualifying collision in the past three years	15
Traffic Speeds	1 point for each km/h above posted speed	20
Non-Local Traffic	2 points for each 10% of non-local traffic above 20% (maximum reached at 60% non-local traffic)	10
Traffic Volumes	1 point for every 100 vehicles above the Collector/Tertiary Arterial volume threshold	20
Pedestrian Generators	5 points for each school or park within the study area (other Pedestrian Generators may be defined by Sudbury)	10
Pedestrian Facilities	10 points if there are no sidewalks within the study area, 5 if only on one side	10
Emergency Services and Routes	-6 points if the study area is a primary EMS route	0
Transit Services and Routes	-4 points if the study area is an existing or planned transit route	0
Block Length	1 point for each 50m increment between stop-controlled points	10
Adjacent Land Uses (residential)	1 point for each 20% of residential land use	5
		100

3.2.2 EMERGENCY AND TRANSIT ROUTES

Traffic calming devices are often considered to be a problem for emergency vehicles and buses. The scoring system developed for Sudbury recognizes this concern and scores potential sites accordingly. Under this scoring system, if a particular road is not an emergency or transit route, it receives zero points in each category, i.e. the maximum. The presence of one or more of these routes would therefore subtract points from the overall score. The scoring also reflects that these routes are more likely to be present on Collectors or Tertiary Arterials than on Local Roads, and subtracts more points for those roadway classifications. Further considerations of the impacts of traffic calming devices on emergency and transit vehicles are addressed in the policy document, in Step 4 of the framework, which guides the selection of measures.

3.2.3 NON-LOCAL TRAFFIC

It is also understood that determining the percentage of non-local traffic within a study area may be a costly and time-consuming process. The City may not have the resources to conduct a full survey and may be required to estimate the percentage of cut-through traffic. As a result, the scoring for non-local traffic falls into 'bins' of 10 percent each. The following list contains four recommendations of how non-local traffic may be recorded or estimated, beginning with the method requiring least effort. Each alternative requires that the City determine an appropriate 'local' area prior to estimation.

1. Determine the peak hour trip generation potential of the local area based on its land uses and compare it to the recorded peak hour traffic counts;
2. Apply the following formulas:

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$$\text{Local Road Non- Local Traffic Percentage} = 1 - \left(\frac{1,000}{ADT} \right)$$

$$\text{Collector Non- Local Traffic Percentage} = 1 - \left(\frac{3,000}{ADT} \right)$$

This formula implies that a Local Road with an ADT less than 1,000 vehicles as a low potential for cut-through traffic. The formula may also be applied to Tertiary Arterials using a numerator volume of 5,000; however, given the function of a Tertiary Arterial and the variation in typical arterial volumes, other methods should be explored.

3. Record the license plates of all vehicles that pass through one or more points of the local area. The recorded license plates are then submitted to MTO, which in turn will supply the Forward Sortation Area (FSA) of the address where each vehicle is registered. The FSA is the first three characters of the postal code, and each FSA represents a geographical area of the province. It can then be determined which of these trips originate or end within the local area. It should be noted however, that the urban area of the Sudbury is covered by a total of five FSAs, so this approach will not accurately identify traffic that is explicitly local to the study area; or
4. Conduct a full origin-destination study at all entry and exit points of the local area. Match the license plates of entering and exiting vehicles to determine the percentage of vehicles that pass through the entire local area compared to those that begin or end their trips within. This approach is the most accurate of the four approaches, and it recommended if staff/budget resources are available.

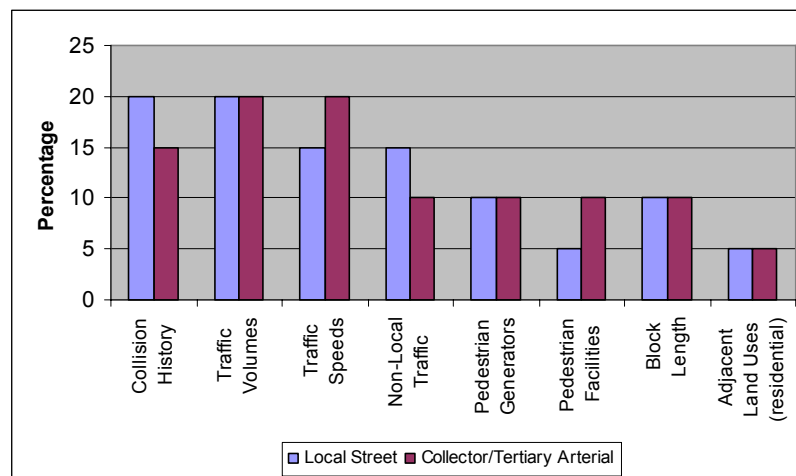
3.2.4 DETERMINING THE 'LOCAL AREA'

For a Local Road, the local area should be comprised of the Local Road, at a minimum; while for a Collector or Tertiary Arterial, the local area may be defined as the section of the roadway that connects the nearest higher-order roads, as well as the other intersecting roadways.

3.2.5 RANKING COMPARISON BETWEEN LOCAL ROADS AND COLLECTORS/TERTIARY ARTERIALS

Exhibit 3-6 compares the ranking criteria for Local Roads and Collectors/Tertiary Arterials. It can be seen that for Local Roads, more emphasis is placed on factors such as non-local traffic and the collision history of the street.

The primary function of a Tertiary Arterial is to connect with other arterial and collector roads and have limited local road access, while the primary function of a Collector is to move traffic from Local Roads to higher-order roads. As such, higher volumes and perhaps higher speeds are expected. More weight is therefore given to the speed of these roadways, as well as the presence or lack of pedestrian facilities on a Collector, because of the associated safety risks of higher speeds and volumes.

Exhibit 3-6: Comparison of Local Roads vs. Collectors/Tertiary Arterials

4. PILOT TESTING

IBI Group conducted sensitivity analysis in the form of a pilot test of the volume and speed warrants to determine their appropriateness for the City of Greater Sudbury. To support this task, Sudbury provided speed and/or volume data for 63 locations throughout the city. Fifteen of the locations are secondary arterials. Given that traffic calming measures would not typically be installed on this type of roadway, these streets were not included in the analysis. The remaining 48 locations were comprised of 41 collectors and 7 local roads.

While collision data and distance between controlled intersections were provided for all locations, only 10 sites had both volume and speed data. Of the remaining sites, 30 were volume-only, while 8 were speed-only.

The original goal of the sensitivity testing was to analyze the number of sites that would qualify for traffic calming based on a combination of the speed and volume warrants. As indicated in **Exhibit 3-2**, a site qualifies for traffic calming if both the recorded speed and two-way ADT volumes are above the minimum thresholds. Given that so few sites had both volume and speed data, alternative pilot testing analysis was performed, as discussed in the following sections.

Caution should be exercised when interpreting the results, given the small sample sizes.

4.1 Speed

The first pilot test was undertaken to determine the appropriate minimum speed for the initial qualification discussed in **Section 3.1**. It is likely that the majority of streets where traffic calming is requested will have posted speed limits of 40 km/h or 50 km/h. The first step was to calculate the average, median, maximum and minimum speeds of the studied roadways, and categorize them by both posted speed and classification.

Exhibit 4-1 indicates that with the exception of Local Roads posted at 50 km/h, the average 85th percentile speed of all roadways is above the posted speed. The results also indicate a maximum 85th percentile speed of 65 km/h (Collectors posted at 40 km/h), and a minimum 85th percentile speed of 45 km/h (Collectors posted at 50 km/h).

Exhibit 4-1: Pilot Testing: 85th Percentile Speeds

Roadway Type	85th Percentile Speed (km/h)			
	Average	Median	Max	Min
Overall	56	58	65	45
All Collectors	58	59	65	45
All Local Roads	51	51	56	46
Collectors - 50 km/h	57	58	63	45
Local Roads - 50 km/h	48	48	50	46
Collectors - 40 km/h	64	64	65	64
Local Roads - 40 km/h	54	54	56	53

When determining the minimum qualification threshold, it is important to select a value that will neither include nor exclude an unfair number of sites. It was seen that for the two classifications and two likely posted speeds, no single speed threshold would suffice. **Exhibit 4-2** shows the cumulative frequency of the 85th percentile speed for each of the two roadway classifications. It can be seen that for Local Roads in particular, setting a threshold of 40 km/h would include all of the studied roads, while setting it at 50 km/h would include about 50% of the roads. Likewise, a minimum threshold of 40 km/h would qualify every Collector. Again, caution should be exercised when interpreting the data presented in the exhibit, particularly with the local roads, given the small sample size.

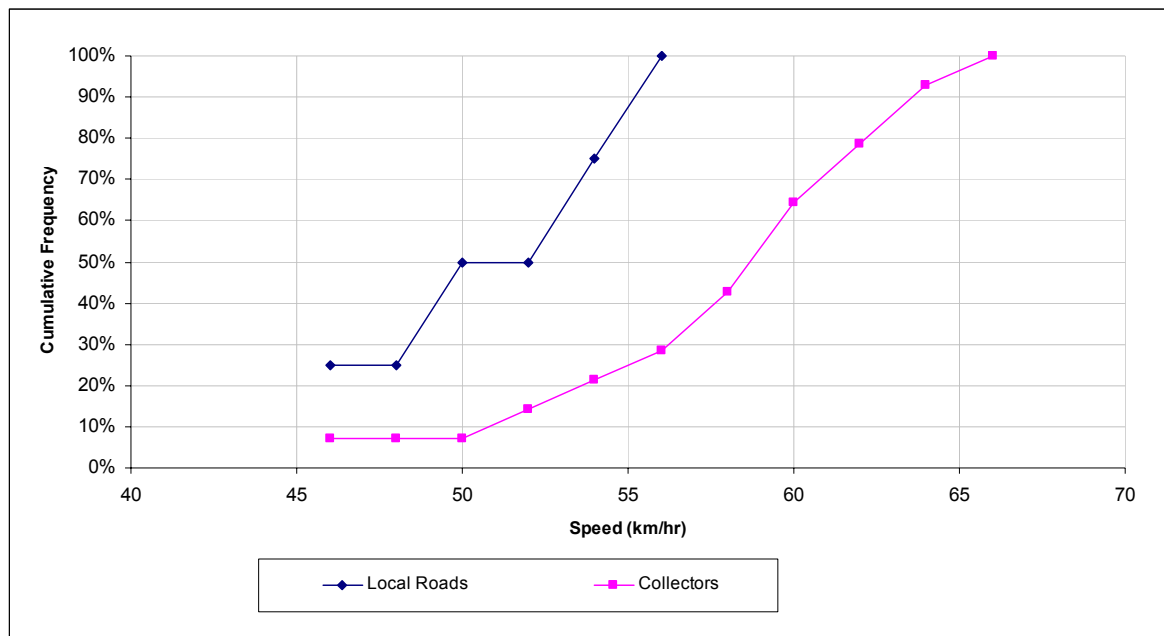
Exhibit 4-2: 85th Percentile Speed Cumulative Frequency Curves

Exhibit 4-3 shows that when the posted speed limit is used as the speed threshold, 89% of the studied roadways will meet this portion of the traffic calming warrant. 100% of 40 km/h roadways satisfy the criteria, as well as 92% of 50 km/h Collectors. These results do not mean that the roads will automatically qualify for traffic calming, as the volume component of the warrant must also be satisfied. Pilot testing of volumes is discussed in the following section. **Based on the results of the pilot testing, IBI Group recommends using the posted speed limit as a minimum threshold for this warrant.**

Exhibit 4-3: Pilot Testing: Qualification Based on 85th Percentile Speed Greater Than Posted Speed

Roadway Type	Posted Speed	Total Sites	Number Qualifying	Percentage Qualifying
Collectors	40 km/h	2	2	100%
Local Roads		2	2	100%
Collectors	50 km/h	12	11	92%
Local Roads		2	1	50%
All Roads	Varies	18	16	89%

4.2 Volume

As with speeds, pilot testing the volume component of the warrant consisted of determining the appropriate minimum threshold for qualification. The previously completed Best Practices Report notes that many jurisdictions use two-way ADT volumes of 900 vehicles for Local Roads and 2,000 vehicles for Collectors. There is no prevailing convention for arterial roadways, as many jurisdictions do not permit traffic calming on any arterial roadways. However, roads in Sudbury that are classified as Tertiary Arterials are similar to (major) Collectors in other jurisdictions.

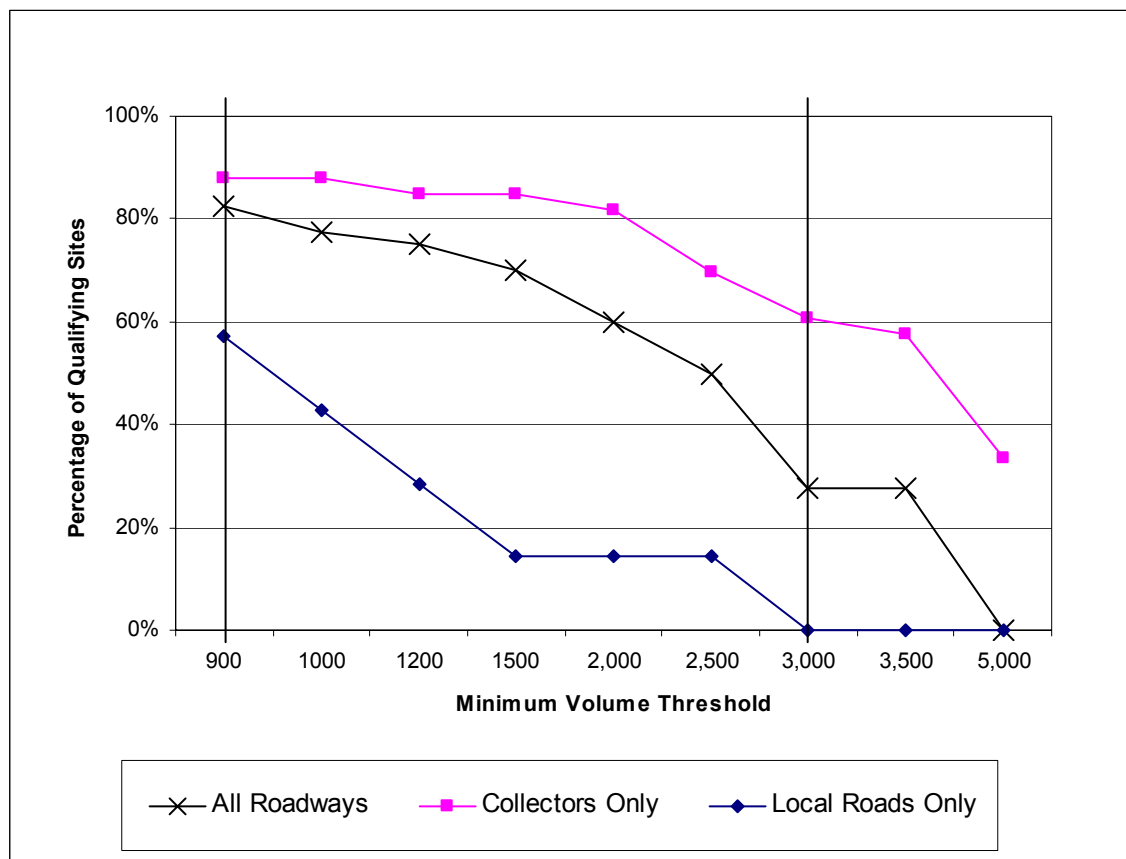
For this pilot test, the percentage of qualifying sites was plotted against various volume thresholds, as shown in **Exhibit 4-4**. It can be seen that nearly 60% of analyzed local roads would qualify with a minimum threshold of 900 vehicles. Given the small sample of local roads, it is anticipated that this percentage would decrease if more sites were analyzed, and therefore, **it is recommended that Sudbury use 900 as the minimum AADT for qualifying local roads.**

3,000 vehicles is an appropriate threshold for Collectors, with 60% of sites qualifying. Once the threshold reaches 3,500 vehicles, the number of qualifying sites drops significantly. As previously noted, 2,000 vehicles is a common threshold in other jurisdictions. If the city undertakes additional pilot testing of collectors and it is determined that too few sites qualify for traffic calming, this threshold can be lowered, although it is not recommended to lower it below 2,000 vehicles.

As noted above, no data was provided for tertiary arterials. IBI Group recommends that Sudbury follow the approach of other jurisdictions when dealing with major collectors or minor arterials and set a minimum threshold of 5,000 vehicles per day.

To summarize, the following volume thresholds were carried forward:

- Local Roads: 900 vehicles per day;
- Collectors: 3,000 vehicles per day; and
- Tertiary Arterials: 5,000 vehicles per day.

Exhibit 4-4: Pilot Testing: Volume Threshold Curves

4.3 Speed + Volume

The warrant is structured such that a site needs a combination of both speed and volume to pass the initial qualification process. The next step in the pilot testing was to use the thresholds discussed in **Sections 4.1** and **4.2** to determine how many of the 10 analyzed sites with both volume and speed data would qualify for traffic calming based on their two-way ADT and 85th percentile speeds, as well as the range of points the sites would receive based on the scoring process discussed in **Section 3.2**.

Exhibit 4-5 shows that 40% of all pilot tested sites would qualify for traffic calming based on these thresholds. The qualification percentage of the individual classifications is also shown.

Exhibit 4-5: Pilot Testing: Qualification & Scoring Based on Speed and Volume

Classification	Number of Sites	Number Qualifying	Percentage Qualifying	Minimum Score	Average Score	Maximum Score ³
Collector	6	2	33%	26.11	29.28	32.44
Local Road	4	2	50%	17.88	20.79	23.70
All Roads	10	4	40%	17.88	25.03	32.44

³ Combination of speed and volume. Remaining score out of 100 is made up of other factors discussed in **Section 3.2.1**.

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Despite the small sample size, 40% qualification based on a combination of speed and volume is in line with similar work in other jurisdictions. The percentage may appear high, but it is important to note the range of scores shown in **Exhibit 4-5** and consider that simply qualifying for traffic calming is no guarantee that a site will ever rise to the top of the candidate sites and actually proceed to the design and implementation phase. When all factors are considered, the maximum score for any site is 100 points. Up to 40 points may be received for speed and volume alone for a collector (up to 35 points for a local road). It is unlikely that most sites receiving an average or below average score for speed and volume will be able to make up the points elsewhere.

In conclusion, it was determined that if the 85th percentile speed of a site is higher than the posted speed limit, and if the road is carrying volumes higher than a determined threshold, it is prudent to at least consider it for traffic calming.

4.4 Inclusion of Crashes and Block Length

As noted above, all 48 collector roadways included collision data and block length, two additional components of the warrant process. **Exhibit 4-6** shows the scores of these 48 collectors when all provided information is incorporated into the recommended warrant scoring. As indicated in **Exhibit 3-5**, the maximum category scores for collectors and tertiary arterials are as follows:

- Traffic Volumes – 20 points;
- Traffic Speeds – 20 points;
- Collisions – 15 points; and
- Block Length – 10 points.

It can be seen that applying the warrant criteria to these sites yields a wide scoring range, which satisfies the intent of the warrant to create a process whereby some sites qualify for traffic calming, but not all of those sites will score so highly as to rise to the top of the implementation list.

Exhibit 4-6: Pilot Testing Including Crashes and Block Length

Category	Number of Sites	Possible Score	Minimum Score	Average Score	Maximum Score
Volume Only	30	45.00	2.00	21.74	36.60
Speed Only	8	45.00	7.66	16.24	32.90
Volume + Speed	10	65.00	10.00	29.60	50.24


5. TRAFFIC CALMING WARRANT SPREADSHEET TOOLS

As part of this assignment, IBI Group developed two spreadsheets for the City of Greater Sudbury to use in the traffic calming warrant process. These spreadsheets consist of an analysis worksheet tool and a summary report generator. The two files, along with a City of Greater Sudbury logo, should be saved to the same folder on the City of Greater Sudbury network.

5.1 Traffic Calming Warrant Analysis Worksheet

The Traffic Calming Warrant Analysis Worksheet is designed to aid City staff in determining if a site is eligible for traffic calming. The worksheet is divided into four sections, as shown in **Exhibit 5-1**.

Exhibit 5-1: Traffic Calming Analysis Worksheet



Greater Sudbury
Roads and Transportation Services
Traffic Calming Warrant Analysis Worksheet

1.

Today's Date (yyyy-mm-dd)

Analyst

Location

Road Type Local Road ▼

Posted Speed

Requested By

Description of Complaint

2.

Preliminary Screening

Criteria	Value	Result
Grade		
Collision History		
Traffic Speeds		
Non-Local Traffic		
Traffic Volume		

3.

Evaluation Scoring and Ranking

Criteria	Value	Points
Collision History		
Traffic Speeds		
Non-Local Traffic		
Traffic Volumes		
Pedestrian Generators (school, park, etc to be defined by Sudbury)	▼	
Does the location have sidewalks?	▼	
Is the location a primary EMS Route?	▼	
Is the location an existing or planned Transit Route?	▼	
Block Length		
Adjacent Land Uses (residential)		

4.

Save File and
Start Another

Save File and
Close

Clear All

1. General Information

- **Today's Date:** used for sorting and determining the new eligibility date for sites that fail to meet the minimum criteria;

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- **Analyst:** City of Greater Sudbury staff name;
 - **Location:** Descriptive information about the site;
 - **Road Type:** Drop-down box with five choices: Local Road (default), Collector, Tertiary Arterial, Arterial, Other;
 - **Posted Speed:** Speed limit in km/h. (Do not type 'km/h' when entering data into this field; it will be automatically added by Excel);
 - **Requested By:** The name of the resident, group or business requesting traffic calming; and
 - **Description of Complaint:** Text field for entry of problem/complaint.
2. **Preliminary Screening.** This is the initial criteria that will determine if the site is eligible for traffic calming:
- **Grade:** Enter The grade of the subject roadway as a percentage (do not type '%'; it will be automatically added by Excel);
 - **Collision History:** The number of collisions in the past three years involving vulnerable road users (primarily pedestrians and cyclists) and/or which could be potentially corrected by traffic calming measures;
 - **Traffic Speeds:** The 85th percentile speed of the subject location (do not type 'km/h'; it will be automatically added by Excel);
 - **Non-Local Traffic:** Percentage of traffic as defined in **Section 3.2** (do not type '%'; it will be automatically added by Excel); and
 - **Traffic Volume:** Two-way ADT of the road.

Built-in logic provides instructions and guidance to the analyst when entering data into this portion of the spreadsheet. For example, if the grade is greater than eight percent, the spreadsheet will indicate that the location is not eligible for traffic calming. Similarly, the spreadsheet tracks the compliance of the speed and non-local traffic prior to the user entering the ADT of the road.

The spreadsheet also validates the entered data to ensure that it falls within pre-defined ranges, in order to limit improper data entry.

3. **Evaluation Scoring and Ranking.** If Section 2 of the spreadsheet indicates "Proceed to ranking section," the site is eligible for traffic calming.



If Section 2 reads: "This location is not eligible for traffic calming," Section 3 does not need to be completed.

This section is then used to enter additional data that will score and rank the site against other sites. It incorporates the following:

- **Collision History, Traffic Speeds, Non-Local Traffic and Traffic Volumes:** These values are automatically imported from Section 2 of the spreadsheet;

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- **Pedestrian Generators:** The drop-down box lets the user select between '0', '1' or '2 or more.' Pedestrian generators are defined as schools and parks, although the City of Greater Sudbury may choose to add additional generators to the approved list;
- **Sidewalks:** A drop-down box offers the choice of 'Yes – Both Sides,' 'Yes – One Side' or 'No' and assigns the appropriate points;
- **Emergency/Transit Route:** drop-down boxes allow the user to select 'Yes' or 'No' for these categories;
- **Block Length:** this is the length in metres of the subject block between stop-control points (do not type 'm'; it will be automatically added by Excel); and
- **Adjacent Land Uses:** Enter the percentage of residential land use within the study area (do not type '%'; it will be automatically added by Excel).

Logic built into the spreadsheet will populate the 'Points' column and maintain a running sum as the user moves through this section. Data validation similar to Section 2 again attempts to limit the entry of incorrect data.



If the total score is less than 30 points, the spreadsheet will indicate that the site is not eligible for traffic calming based on score, as discussed in Section 3.2.

4. **Macro buttons.** Since the Analysis Worksheet is read-only and protected, these buttons are used to save individual files and clear the worksheet.

- **Save File and Start Another:** This button saves the current file into the current directory with a pre-determined naming convention of '[location] – [date].xls.' The location and date are automatically inserted into the filename from data entered in Section 1. The newly saved file is then closed, and the Analysis Worksheet is cleared of data and re-opened for analysis of the next site.



Example: if the location is Southview Drive and the analysis date is August 12, 2008, clicking this button will save the file as 'Southview Drive 2008-08-12.xls'


- **Save File and Close:** This button will save the file as described above, clear the data and close the analysis worksheet. It is intended to be used when the last site is entered in a particular session.
- **Clear All:** This button will clear all fields of their data and reset the Road Type field to 'Local Road.' It does not save the worksheet.

5.2 Traffic Calming Warrant Summary Table Generator

This file contains code that generates a summary report of the Traffic Calming Warrant Analysis Worksheets. This file must be saved in the same folder as the worksheets. The macro extracts data from the worksheets, summarizes it in a new sheet within the same file and sorts it based on total score, as shown in **Exhibit 5-2**.

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Exhibit 5-2: Traffic Calming Warrant Analysis Summary Report

<div style="display: flex; justify-content: space-between; align-items: center;">  <div style="text-align: center;"> City of Greater Sudbury Roads and Transportation Services Traffic Calming Warrant Analysis Summary Report </div> </div>								
Analysis Date	Analyst	Location	Road Type	Posted Speed	Requested By	Nature of Complaint	Score	Eligibility Date
2008-07-04	AA	Test 5	Collector	50	Resident	[Issue]	89.7	
2008-07-03	AA	Test 4	Collector	40	Resident	[Issue]	72.4	
2008-07-02	AA	Test 3	Local Road	40	Resident	[Issue]	67.8	
2008-08-07	AA	Test 6	Tertiary Arterial	50	Resident	[Issue]	43.1	
2008-07-02	AA	Test 2	Local Road	50	Resident	[Issue]	35.8	
2008-06-25	AA	Test 1	Collector	50	Resident	[Issue]	Not Eligible	2010-06-25
2008-08-08	AA	Test 7	Collector	50	Resident	[Issue]	Not Eligible	2010-08-08

The header and footer are automatically generated, and the new worksheet is ready for printing. The new worksheet can also be copied and pasted into another Excel file or other document.

The code extracts data from any spreadsheet in the folder containing a worksheet named 'input sheet.' Care must therefore be taken in worksheet naming if the City wishes to include other (i.e. non Traffic Calming) spreadsheets in the same folder.



The number of years of ineligibility for sites that fail the warrant is user-defined by the value in cell C15 of the worksheet. The summary table will use this number to determine the new eligibility date.

If more than one report is to be generated in the same day (e.g. after new sites have been entered) the summary sheet must be renamed or deleted before the second report is generated.

6. ANTICIPATED LEVEL OF STAFF EFFORT

This traffic calming warrant has been specifically designed to require a similar level of effort to a traffic signal warrant. That is, once all of the required input data has been collected, running the warrant spreadsheet should only be a matter of minutes. Much of the required input data is information that is expected to be readily available, e.g.:

- Presence or absence of transit or emergency routes;
- Block length between controlled intersections;
- Land use data;
- Pedestrian facilities and pedestrian generators; and
- Collision data.

In many cases, the city will have volume and speed data already on hand for the location. For those locations where this data is not available, it will need to be collected prior to warrant analysis. As discussed above, the most resource-intensive component of the data collection will be the determination of non-local traffic. This report provides guidance on four different methods of estimating non-local traffic percentages.

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Once a site is selected for further study, additional effort will be required. The anticipated extent of this effort will be discussed in the traffic calming policy deliverable of this assignment.

7. CONCLUSION

This report represents a major component of the City of Greater Sudbury's upcoming Traffic Calming Policy. It provides a framework by which requests for traffic calming can be screened for consideration and then scored and ranked against each other. The policy document, when complete, will also provide guidance for the selection of appropriate traffic calming measures and outline a process by which sites selected for consideration will move through the design, approval and implementation stages.

As noted elsewhere in this report, no standard traffic calming warrant exists in North America, and various jurisdictions have developed their own warrants tailored to suit their particular needs. While the traffic calming warrant developed through this study incorporates elements of other jurisdictions' warrants, care was taken to ensure that the warrant meets the needs and concerns of Sudbury, through:

- The inclusion of screening and evaluation factors approved by City of Greater Sudbury staff;
- A consultation process between IBI Group, the City of Greater Sudbury and the public; and
- Extensive pilot testing of warrant criteria based on traffic and roadway data collected by the City.

Exhibit 3-4 and **Exhibit 3-5**, discussed previously, summarize the scoring criteria for Local Roads and Collectors/Tertiary Arterials, respectively. When properly applied, the warrant and associated spreadsheet tools will assist the City of Greater Sudbury's response to future traffic calming requests through a standardized and streamlined process.

APPENDIX A

TRAFFIC CALMING WARRANT SURVEY RESPONSES

Sudbury City-Wide Traffic Calming Policy - Summary of 23 Online Questionnaire Responses

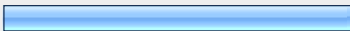
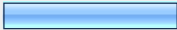
1. Based on your observations, please tell us how significant the following traffic issues are in your neighbourhood:				
	Very Significant	Somewhat Significant	Not Significant	Response Count
High traffic speeds	77.3% (17)	13.6% (3)	9.1% (2)	22
High volume of cut-through (non-local) traffic	63.6% (14)	4.5% (1)	31.8% (7)	22
Crashes (actual or near-misses)	45.5% (10)	27.3% (6)	27.3% (6)	22
Danger to pedestrians and bicyclists	59.1% (13)	18.2% (4)	22.7% (5)	22
Difficulty in leaving or entering your driveway or street	45.5% (10)	13.6% (3)	40.9% (9)	22
	answered question			22
	skipped question			1

2. Please describe the perceived issue in detail. For example, include a description of the issue, the location, time of day, and days of week. If you perceive an issue that is different from those listed above, please describe it.

#	Response Date	Response Text
1.	5/12/2008 9:11:00 PM	high volume of industrial vehicles,high volume of all types of vehicles
2.	5/13/2008 11:49:00 PM	Very difficult exiting driveway during peak hours 8:00 to 9:00 a.m. and 5:00 to 6:00 p.m.
3.	5/15/2008 1:19:00 PM	Motor vehicles are bypassing slow traffic on Southview Drive and re-routing to Robinson Drive to get to Kelly Lake Road.
4.	5/16/2008 8:59:00 PM	We have to back into the driveway as we are not able to back out on to the street most of the time. Both the amount of traffic and the speed makes it very difficult to back out. Some drivers are very courteous while many others are not. A slow down -hidden driveway sign would be helpful.
5.	6/2/2008 2:19:00 PM	alternate route to Lasalle Blvd
6.	6/3/2008 1:47:00 PM	A few years ago, in crossing Bouchard St. from Southview Dr. I was nearly hit by fast moving vehicle swinging around the Southview curve heading down Bouchard St. hill. A serious car accident occurred at that 3 way intersection awhile ago with a driver suffering a back injury. It used to be difficult to cross during the hours between 4 and 6 P.M., but now it's all the time; a steady stream of cars coming all 3 ways. Because of the steep hill cars speed up starting at Marcel St. Please remove the Bouchard St./Marcel St. playground as it is too dangerous an area now with so much fast traffic going up and speeding down that Bouchard St. hill.
7.	6/25/2008 5:10:00 PM	There is no stop sign from Gloria's Restaurant to the convenience store at Kelly Lake Road. We live on Cranbrook Cres & I have had cars pass me on the left hand side while I was at a full stop waiting for oncoming traffic to clear before making a left hand turn onto my street. Our son was hit by a car at age 11 at the stop on Kelly lake rd & southview while delivering flyers for the Northern life. Drivers have NO consideration for pedestrians, bike riders or older adult walkers. There are few crosswalks on Southview which has many students walking to Lockerby, MacLeod Public, Corpus Christi and the school on Stephen street. Drivers ignore the crosswalks that are there. And if you stop for a pedestrian already in the crosswalk you risk being rear ended by an impatient driver. There is a park (Robinson Lake) & lots of people use it for sports, to play on the equipment (or bocce or skating) & Southview is a great walking/biking route except for the drivers. (You guys did a GREAT job in getting rid of the big trucks -Thanks!)
8.	7/2/2008 3:26:00 PM	I'm at 1495 Southview, near Bouchard St. The traffic from Bouchard comes up an incline on a curve, making it hard to see. Added to that is Southview curves again just as the traffic enters off Bouchard. My home is within the curve, i.e. Southview curves again just past my home so I'm also blind to traffic on that side. Pulling out of my driveway is a life-threatening experience due to the high speeds, high volume at peak times and high snow banks in the winter. The new "slow down" flashing signs worked for a couple of days to somewhat ease the problem, but they don't address the main issue of the curve in the road and the traffic coming from the Bouchard end of the street.

2. Please describe the perceived issue in detail. For example, include a description of the issue, the location, time of day, and days of week. If you perceive an issue that is different from those listed above, please describe it.

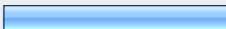
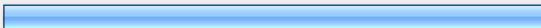
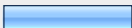
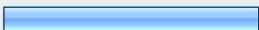
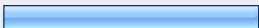
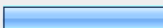

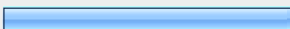



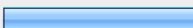

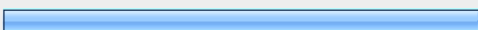
9.	9/3/2008 12:58:00 PM	Coming up or Down Lasalle Blvd(by pass) to Notre Dame is HORRIBLE. The lights only stay green for maybe 10 vehciles (5 per lane) to get through before it turns red. Why not let people sit another 30 seconds to 1 min and let 50 vehciles through... To sit on Lasalle to do up the bypass and v.s. for 20 mins is totally unnecessary. Sudbury has the WORST light system I and may others have encountered, if you have a turn left light let the through wait and let both sides turn left, then RED that light and let both sides go through, this waiting 4 lights to let 10 cars through is pure nonsense!!!! have someone sit at this intersection on a work morning and night and access this situations
----	----------------------	---

3. Have you or anyone you know requested traffic calming for your street or neighbourhood?			
		Response Percent	Response Count
Yes		54.5%	12
No		27.3%	6
Unknown		18.2%	4
		<i>answered question</i>	22
		<i>skipped question</i>	1

4. What was the outcome or current status of the request?

#	Response Date	Response Text
1.	5/12/2008 9:12:00 PM	nothing, we missed the deadline for stop signs, i request stop signs and this is what i got calming study
2.	5/13/2008 12:32:00 PM	None at first. Temporary radar sign indicating speed being travelled on 2 separate occasions.
3.	5/13/2008 11:49:00 PM	Pilot project being conducted for my street (Southview Drive between Janmar & Bouchard).
4.	5/16/2008 9:00:00 PM	A number of years ago, my nextdoor neighbour and I went to the police station to complain about the speeding and traffic. I volunteered to have the police set up in the driveway and was told they could not as it was too dangerous.
5.	6/3/2008 1:47:00 PM	It is being worked on, but not fast enough for my liking.
6.	6/17/2008 2:45:00 AM	none
7.	6/20/2008 10:06:00 AM	no action.
8.	6/24/2008 11:50:00 PM	city is working on it
9.	6/25/2008 2:18:00 AM	unresolved
10.	6/25/2008 5:13:00 PM	Aparent lack of traffic on Cranbrook to warrant a stop sign. We know that- that is the appeal of the neighbourhood. What we want is a stop sign so the drivers will slow down. Please put in a crosswalk so we can get to the bus stop safely & so the school kids can cross the street. Or get our police to patrol the area more frequently & fine some speeders!
11.	7/2/2008 3:28:00 PM	New signs near Cranbrook calmed the traffic at that end for a few days but nothing is done at the Bouchard end of the street.

5. Please check the traffic calming devices you have experienced, either in Sudbury or elsewhere:

		Response Percent	Response Count
"Traffic Calmed Neighbourhood" Sign		35.0%	7
Speed Hump		85.0%	17
Mini Roundabout		20.0%	4
Raised Crosswalk		40.0%	8
Traffic Circle		40.0%	8
Raised Intersection		25.0%	5
Chicane		20.0%	4
Raised Median		45.0%	9
Curb Extension		35.0%	7
Traffic Diverter		5.0%	1
Intersection Bump-Out		35.0%	7
Directional/Full Closure of Roadway		30.0%	6
Lane Narrowing		40.0%	8
On-Street Parking		75.0%	15
	answered question		20
	skipped question		3

6. Please describe your experiences -- positive or negative -- with one or more of the measures you checked in Question 5:

#	Response Date	Response Text
1.	5/12/2008 9:15:00 PM	vechicle will get hit by other vechilces if parked on the street two accedints in front of 1642 southview dr in the past 4 years is this acceptable
2.	5/13/2008 11:56:00 PM	Traffic Calming in Toronto on Yonge Blvd between Yonge St. & Wilson. Speed humps and four way stops on Jedburgh Rd which runs parallel to Yonge St. in the Yonge/Lawrence/ Yonge Blvd area of Toronto.
3.	5/15/2008 1:23:00 PM	All were positive in that they seemed to slow traffic down.
4.	6/3/2008 1:47:00 PM	I didn't have a problem with any of the above devices. Windemere St in Beaconsfield Quebec recently put in speed bumps and they are annoying, but slow down traffic.
5.	6/17/2008 2:46:00 AM	positive
6.	6/20/2008 10:06:00 AM	their effective ways to control traffic
7.	7/2/2008 3:30:00 PM	Most of the measures I've experienced are in communities that don't get the level of snow we do, so I think snow removal would be an even bigger problem than it is now. Perhaps a chicane just before my home would give me a chance at pulling out of the driveway safely.

7. Please rank the traffic calming criteria that Sudbury may consider as part of its policy and ranking/prioritization process. The criteria should be ranked from 1 (Most Important) to 10 (Least Important) in their order of importance to you.

	1 (Most Important)	2	3	4	5	6	7	8	9	10 (Least Important)	Response Count
Traffic Speeds	46.2% (6)	23.1% (3)	23.1% (3)	0.0% (0)	0.0% (0)	0.0% (0)	7.7% (1)	0.0% (0)	0.0% (0)	0.0% (0)	13
Traffic Volumes	28.6% (4)	21.4% (3)	0.0% (0)	28.6% (4)	21.4% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	14
Collision History	0.0% (0)	20.0% (2)	30.0% (3)	20.0% (2)	0.0% (0)	0.0% (0)	20.0% (2)	10.0% (1)	0.0% (0)	0.0% (0)	10
Diverted ("Cut-Through") Traffic	9.1% (1)	9.1% (1)	18.2% (2)	18.2% (2)	27.3% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	18.2% (2)	11
Road Classification (Arterial, Collector, Local Road) and Grade	0.0% (0)	0.0% (0)	11.1% (1)	11.1% (1)	22.2% (2)	0.0% (0)	22.2% (2)	22.2% (2)	0.0% (0)	11.1% (1)	9
Adjacent Land Uses	0.0% (0)	0.0% (0)	10.0% (1)	10.0% (1)	0.0% (0)	20.0% (2)	0.0% (0)	30.0% (3)	10.0% (1)	20.0% (2)	10
Pedestrian Generators (e.g. parks, schools) and Facilities (e.g. sidewalks)	15.4% (2)	15.4% (2)	15.4% (2)	7.7% (1)	30.8% (4)	0.0% (0)	15.4% (2)	0.0% (0)	0.0% (0)	0.0% (0)	13
Residential Consultation and Support	16.7% (2)	8.3% (1)	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (2)	16.7% (2)	0.0% (0)	25.0% (3)	16.7% (2)	12
Emergency Services and Routes	16.7% (2)	8.3% (1)	8.3% (1)	0.0% (0)	8.3% (1)	25.0% (3)	16.7% (2)	8.3% (1)	8.3% (1)	0.0% (0)	12
Transit Services and Routes	7.1% (1)	0.0% (0)	14.3% (2)	14.3% (2)	0.0% (0)	14.3% (2)	0.0% (0)	21.4% (3)	14.3% (2)	14.3% (2)	14
	answered question										19
skipped question											4

8. If there is any other criteria that you think we have missed, please describe it here and also tell us how important it is to you on a scale of 1-10.

#	Response Date	Response Text
1.	5/12/2008 9:18:00 PM	industrial traffic rated a 4
2.	5/15/2008 1:31:00 PM	lit would be important to include a supporting policy for maintenance of the traffic calming item as well as an evaluation component.
3.	6/25/2008 5:17:00 PM	consideration for the largest segment of the population driving -the older adults who may be driving slower. Our roads are not a raceway- Please get drivers to slow down10
4.	9/3/2008 1:00:00 PM	traffic light timing

9. Please provide any other comments you feel may be relevant to the development of a traffic calming policy -- including a warrant, ranking and prioritization process -- for the City of Greater Sudbury.

#	Response Date	Response Text
1.	5/12/2008 9:19:00 PM	Circle of study has to be larger
2.	5/15/2008 1:36:00 PM	It would be important to abide by the philosophy that dangerous areas should be managed as a priority instead of removing pedestrian infrastructure.
3.	5/16/2008 9:04:00 PM	It is important to maintain parking on one side of the road or the other.
4.	6/25/2008 5:19:00 PM	consider working with the police to assist in your traffic calming policies. Perhaps just in the beginning to let drivers know that lifestyle issues are important in our cities.
5.	7/2/2008 3:36:00 PM	It isn't enough for the decision makers at City Hall to look at a map. They need to get out a visit the areas and watch the traffic and see for themselves where road design is contributing to the problem.

Summary of 34 Handwritten Questionnaire Responses

1. Based on your observations please tell us how significant the following traffic issues are in your neighbourhood.

	Very Significant	Somewhat Significant	Not Significant
High Traffic Speeds	22	7	2
High volume of cut-through (non-local) traffic.	20	5	6
Crashes (actual or near misses)	8	10	10
Danger to pedestrians and bicyclists	21	8	1
Difficulty in leaving or entering your driveway or street.	15	8	8

2. Have you or anyone you know requested traffic calming for your street or neighbourhood?

Yes: 13 No: 18 No reply: 1

3. If so, what was the outcome or current status of the request?

This meeting.
None.
Joe Cimino has held meetings.
Unknown.
Still being considered.
Mr. Cimino organized last meeting – he was listening to constituents problems.
Very little.
Nothing Done.
Don't know. Spanish River has been allowed to have MINE trucks trucking 24/7, going stupid speeds on a small road. Nothing (has been done).
City police set up trap at Kelly Lk & Southview periodically but they can't be there all the time. Therefore alternative solutions required.

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Nothing.
Traffic hazards were reduced for a time.

4. Please check the traffic calming devices you have experienced, either in Sudbury or elsewhere:

Traffic Calmed Neighbourhood Sign	6	Speed Hump	21
Mini roundabout	8	Raised Crosswalk	8
Traffic Circle	12	Raised intersection	4
Chicane	0	Raised Median	7
Curb Extension	3	Traffic Diverter	2
Intersection Bump-Out	4	Directional/Full Closure of Roadway	7
Lane Narrowing	7	On-Street Parking	6

5. Please describe your experiences – positive or negative – with one or more of the measures you checked in Question 4.

If trucks can not be stopped from going through – not much else can be done. I have been complaining about trucks for 5 years.
The circle was a pain to drive through, so we avoided it. Speed reduction (not mentioned above) – only one we saw evidence of success.
The traffic and speed on this street is a joke!
All were positive in Ottawa – we just slowed down.
Trouble to get in and out of driveway
Speed Humps – does slow traffic – but very dangerous for those not familiar with location.
Obviously traffic has to slow down to navigate these devices.
Very little experience to make an opinion.
1. Traffic circles create car merging problems especially if people are not familiar with the area. 2. Speed humps cause maintenance problems with small tires. The mud flaps on each wheel hit the humps and get damaged.
Did Slow Traffic

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Speed hump - Very effective
Only one I have issue with is the speed bump. Some of them seem too rough even at low speeds.
The 'speed hump' method out in New Sudbury residential area and numerous "Stop Signs" tends to persuade people to use <u>alternative main</u> routes instead...
Humps are too high causing car damage to surprised drivers.
(Speed hump) useful near pedestrians/children.
Tankers, transports should not be allowed to pass thru Lively. Most other cities do not allow this. Reasons – air pollution, noise pollution, hazardous chemicals – INCO, heavy traffic. Existing by-pass adds approx. 1 km to INCO and Tankers full of waste...
Signs are easily ignored, maybe combined with reduced residential speed limits – see 30km/h in T.O.
Speed humps – positive. Slows traffic down. Traffic Neighbour sign – works only for local traffic.
Lane Narrowing and closure of roadways are frustrating. Roundabouts are good.
Traffic circles – positive since you have to yield to oncoming traffic therefore have no choice but to slow down.
Mostly negative.
Speed bump: forces drivers to slow down temporarily.

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6. Please rank the traffic calming criteria that Sudbury may consider as part of its policy and ranking/prioritization process. The criteria should be ranked from 1 (most important) to 10 (least important) in their order of importance to you:¹

	1	2	3	4	5	6	7	8	9	10
Traffic Speeds	22	2	1		2	1				
Traffic Volumes	20	3	1	1	2	1				
Collision History	5	4	1	1	4	2	2		1	1
Diverted (“Cut-Through”) Traffic.	12	1	2	1	3	1	1	1	1	
Road Classification (arterial, collector, local road) and Grade	9	2		2	3		1	1	1	2
Adjacent Land Uses	7	3	1	1	4					5
Pedestrian Generators (e.g. parks, schools) and Facilities (e.g. sidewalks)	11	6	2	1	2	2				
Residential Consultation and Support	11	4	1	1	1	3		2		
Emergency Services and Routes	10	5	1	1	5	1			1	
Transit Services and Routes	11	4	5	1	3					1

¹ 19 respondents answered this question; however, only three answered the question as it was presented. Respondents were to select one criteria for each ranking, i.e. one criteria would be ‘most important’ (rank #1), one criteria would be ‘least important’ (rank #10), etc. 19 respondents selected multiple criteria for a given ranking, e.g. some respondents selected each criteria as ‘most important.’ The results in this table are the raw rankings as submitted by the respondents. The online responses were collected as intended, as the program forced respondents to only select one criterion for each rank. This is discussed further in **Section 3** of this report.

Sudbury - City-Wide Traffic Calming Policy

7. Please provide any other comments you feel may be relevant to the development of a traffic calming policy – including a warrant, ranking and prioritization process – for the City of Greater Sudbury.

You must keep in mind people will walk & bike if space is created. One example of that is the boardwalk in Bell Park. People use it. Sudbury wants an improved image from a 'moonscape'. Creating non-motorized trails and routes will help that.
1.) The weight and the physical size of the city buses causes high vibration in my house when passing on the street. 2.) Years ago, City buses didn't run on Stephen St. as there are no bus signs on the street. 3.) The street is rough and the large buses create excessive vibration in people's homes.
There would be less traffic if the Barrydowne extension went through.
More enforcement.
Traffic Volume (#1) and Traffic Speed (#2) are the top priorities!!! Between the hours of 8:30 -9:30 am and 2:45 to 3:45 pm it is particularly busy due to schools and Bale Inco employees get off from work and traffic from outlying areas ie. Lively etc.
Policy needs to consider smooth flow of traffic; with the needs of the residents within the area of concern, to be respected.
Radar?
(Traffic issues are a) danger to pedestrians...particularly school children and elderly.
High traffic speeds on Elmview Dr. Just concerned with parking issues in summer at soccer time (evening). Soccer is behind the Valley East Library and people park all over. Including private property, daycare, public lawns, even the sidewalk.
Slow things down in residential areas. Promote <u>driver</u> responsibility in residential areas.
Please get the people going through yellow and red lights.
Get " <u>full</u> " service for buses out to Dowling. Students are " <u>forced</u> " to drive for lack of support from city.

APPENDIX B

RECOMMENDED TRAFFIC CALMING FRAMEWORK

