

Date: January 15, 2013

To: Councillor Josh Colle

Copy: Sergeant Michael Matic
Toronto Police Service
13 Division

From: Ann S. Khan, P. Eng. *ASK*
Manager, Traffic Operations

Re: Traffic Flow: Marlee Avenue from Eglinton Avenue West and Lawrence Avenue West
Ref: SR 4463064

Transportation Services, North York District, has reviewed your concerns on behalf of several of your constituents regarding the traffic flow on Marlee Avenue, between Eglinton Avenue West and Lawrence Avenue West, with the intent to improve the live-ability along this roadway for the residents. As such this Division has undertaken a review of the following matters along this section of roadway:

- feasibility of installing traffic control signals at the following intersections:
 - Marlee Avenue at Wenderly Drive
 - Marlee Avenue at Glengrove Avenue
 - Marlee Avenue at Glen Park Avenue
 - Marlee Avenue at Hillmount Avenue
 - Marlee Avenue at Stayner Avenue
- the vehicle volume and speed of vehicles on Marlee Avenue;
- the feasibility of reducing the speed limit from 50 km/h to 40 km/h; and
- the usage of the roadway by heavy trucks (vehicle classification).

Existing Conditions

Marlee Avenue between Eglinton Avenue West and Lawrence Avenue West is classified as a minor arterial roadway having an approximate pavement width of 13 metres and consists of one northbound and one southbound lane, a two-way centre left turn lane and bicycle lanes for both directions. The regulatory speed limit for this roadway is 50 km/h. Pedestrian sidewalks exist on both sides of the roadway. The lands on either side of Marlee Avenue consist of residential properties (single family and high density), commercial strip plazas and park land. It should be noted that the Toronto Transit Commission also operates a surface transit route on Marlee Avenue.

Currently the northbound and southbound traffic on Marlee Avenue is controlled at the following intersections by the following types of traffic control devices:

- Marlee Avenue at Roselawn Avenue (traffic control signal)
- Marlee Avenue at Ridelle Avenue (traffic control signal)
- Marlee Avenue at Viewmount Avenue (pedestrian crossover)
- Marlee Avenue at Glencairn Avenue (traffic control signal)
- Marlee Avenue at Elway Court (pedestrian crossover)

All other roadways that intersect with Marlee Avenue are controlled by east/west stop controls. As such, the main street being Marlee Avenue essentially operates under free flow conditions along this segment of roadway from Eglinton Avenue West to Lawrence Avenue West.

Traffic Control Signal Review

To determine the feasibility of installing a traffic control signal at the requested intersections, eight-hour turning movement counts were conducted at each of the intersections. The technical warrants for the installation of a traffic control signal were satisfied to the following extent:

Marlee Ave at	Warrant Calculations		
	Warrant 1 Minimum Vehicular Volumes	Warrant 2 Delay to Cross Traffic	Warrant 3 Collision Hazard
Stayner Avenue	39%	83%	0%
Hillmount Avenue	48%	73%	0%
Glen Park Avenue	23%	31%	0%
Glengrove Avenue	68%	65%	0%
Wenderly Drive	43%	98%	0%

For the installation of a traffic control signal to be warranted, one of either the Minimum Vehicular Volume or Delay to Cross Traffic warrants must be 100 percent satisfied, or both must be at least 80 percent satisfied. The Collision Hazard warrant is based on the number of collisions *susceptible to correction* by the installation of a traffic control signal. The type of collision susceptible to correction by a traffic control signal or multi-way stop installation, include left-turn collisions as well as right-angle collisions.

As can be seen from the above table none of the intersections have met the minimum required threshold for the installation of a traffic control signal.

Notwithstanding, given that the "Delay to Cross Traffic Warrant" for the intersection of Marlee Avenue and Wenderly Drive is at 98%, we have undertaken a closer examination of this intersection keeping mind that this intersection may meet the warrants in the foreseeable future. As such and with this in mind, we have reviewed the spacing between existing traffic control devices within the immediate section of roadway. Our review has indicated that a pedestrian crossover is located approximately 100 metres to the south at Elway Court to provide pedestrians with a protected crossing area. The traffic control signal at Marlee Avenue and Lawrence Avenue West is located approximately 240 metres to the north. Ideally, traffic control devices, (traffic control signals / pedestrian crossovers) are to be placed at a minimum of 215 metres apart. As this distance decreases, the traffic control measures become cluttered and are less recognizable by motorist. Higher order Traffic Control Devices at close proximity to one another also negatively affect the progressive movement of main street traffic.

Therefore should the "Delay to Cross Traffic Warrant" be met in the future, Transportation Services will review the feasibility of removing the existing pedestrian crossover at Marlee Avenue and Elway Court and installing a traffic control signal at Marlee Avenue and Wenderly Drive.

Speed and Volume Assessment

To assess the existing traffic conditions, 24-hour vehicle volume and speed studies were conducted. The following table identifies the results of those studies:

Marlee Avenue	Dir	Speed Limit	Vehicle Speeds		Traffic Volume		
			Operating	Average	AM	PM	24 Hr
Livingstone Rd - Belgravia Ave	NB	50 km/h	49	40	265	312	4235
	SB		48	38	369	451	5508
Briar Hill Ave - Stayner Ave	NB		48	37	433	341	5310
	SB		44	35	360	499	6690
Viewmount Ave - Hillmount Ave	NB		49	39	502	520	7256
	SB		50	40	421	656	8451
Elway Ct - Wenderly Dr	NB		61	47	582	543	7558
	SB		53	44	588	657	8607

Results of the vehicle speed studies confirm that operating speeds, the speed at which 85% of the motorists are travelling at or below, are below the regulatory speed limit with the exception of the one section of roadway between Elway Court and Wenderly Drive. The operating speed for this section roadway is at 61 km/h in the northbound direction. However, the average vehicle speeds are at and below the regulatory speed limit. These results do not indicate that there are high speeds throughout the entire length of roadway, but only at the north end. This can be attributed the fact that at the north end of the roadway there are no commercial establishments that would generate heavier turning movements (in and outs) from the access driveways, thereby creating less traffic interruption.

It should be noted that at your request, the Traffic Operations Unit deployed the Speed Watch Trailer on Marlee Avenue, south of Glen Park Avenue for southbound traffic from November 6 to November 16. Staff observations during this time period did indicate that motorists, when seeing the Speed Watch Trailer, did reduce their speed. In some instances, vehicle speeds in excess of 60 km/h would be flashed on the display board. As such, the placement of the Speed Watch Trailer as a public awareness/educational measure has proven to be effective. However, it is our experience that the extended use of this type of measure at the same location becomes less effective as motorists that use this roadway on a daily basis are no longer affected by the display of their speed.

Notwithstanding the results of the study, enforcement by the Toronto Police Services has also been conducted on several occasions. The results of the enforcement campaign by the Toronto Police Service, is not available at this time. However, we are recommending that the regulatory speed limit of 50 km/h be enforced as deemed appropriate by the Toronto Police Service.

Speed Limit Reduction

On January 19, 20 and 22, 2007, Toronto City Council adopted a Road Classification System. The City of Toronto's Road Classification criteria identifies legal speed limits ranging from 50 – 60 km/h for major arterial roads (with odd cases of 70 km/h and 80 km/h), 40 – 60 km/h for minor arterial roads and 30 – 50 km/h on local roadways.

The intent of the arterial roads in Toronto is to provide continuous traffic routes between important locations within the City. In most cases, they are comprised of a minimum of two lanes of traffic in order to provide adequate capacity to accommodate high traffic volumes.

It should be noted that, operating speeds tend to vary with traffic density. When traffic density is high (i.e. cars are bumper to bumper with little room to manoeuvre – as in downtown during rush hour), speeds are significantly reduced (30 – 40 km/h). When traffic density is medium (i.e. cars are fairly close with some room for manoeuvrability), speeds are moderate, ranging from 40 to 50 km/h. When traffic is light (i.e. volume is low and ample room for manoeuvrability exists), speeds would be high (50 km/h and greater).

Based on the above, Transportation Services had developed a warrant for the implementation of permanent 50 km/h speed limits on arterial roadways. Additionally, City Council at its meeting of April 23, 24, 25, 26, 27, 2001 and its special meeting held on April 30, May 1 and 2, 2001, approved the harmonized Policy for the introduction of a 40 km/h speed limit on all roadways although primarily for local and collector roadways.

Hence, in keeping with the primary function of the arterial roads, a 60 km/h speed limit is deemed to be the most appropriate, unless the prevailing conditions of roadway, traffic operation and safety warrant indicate otherwise.

The four categories/factors that are used to determine whether the speed of a minor arterial road should be reduced from 60 km/h are pedestrian and bicycle factors, collision factor, roadway geometry factors and roadway operation factors. Whereas the 40 km/h speed limit policy considers various roadway characteristics such as safety concerns, collision patterns, location of pedestrian generators such as school and the absence of municipal sidewalks.

In applying both the criteria's established (summaries attached), a reduction of the speed limit on Marlee Avenue between Eglinton Avenue West and Lawrence Avenue West is not justified.

Although the existing regulatory speed limit on Marlee Avenue is 50 km/h, staff undertook an assessment to determine if the existing speed limit is in keeping with the City's current Policy with respect to the use of a 50 km/h speed limit on an arterial road. As can be seen by the attached 50 km/h warrant summary, the use of a 50 km/h speed limit is has been deemed to be justified.

Staff, has also applied the 40 km/h Speed Limit Warrant and the results are summarised on the attached worksheet. As such, based on the warrant worksheet the feasibility of reducing the speed limit to 40 km/h is warranted on the section of Marlee Avenue from Eglinton Avenue West to Glencairn Avenue West, given that the pavement width is 12.5 metres or less and the operating speed (85 percentile) is equal to or less than 50 km/h. However, the operating speed on the northerly section of Marlee Avenue is greater than 50 km/h and as such the 40km/h warrant has failed for this section of roadway.

As previously noted the variation in the operating speeds on Marlee Avenue can be attributed to several factors. In fact, given that no physical changes are being proposed to the roadway, the majority of motorists will continue to operate their vehicles at the current rate of speed. As such in order to promote and encourage continued positive guidance for motorists a consistent speed limit should be maintained along the entire section of Marlee Avenue. Additionally, given that the average rate of speed on Marlee Avenue is below 50 km/h and that the 85th percentile speed on the majority of the roadway is less than 50 km/h, we do not see a need to change the regulatory speed limit to 40 km/h, nor do we believe that vehicle speeds are problematic. It should also be noted that the reduction of the speed limit on only a portion of Marlee Avenue may only result in greater motorist disobeying the speed limit on this roadway and a greater variance between operating speeds of vehicles.

Furthermore, although other existing minor arterial roadways, such as Ossington Avenue and Oakwood Avenue within the City of Toronto are designated as 40 km/h speed limits, the characteristics of these roadways are significantly different than those of Marlee Avenue. The primary differences between Marlee Avenue and Ossington Avenue and Oakwood Avenue are as follows:

- onstreet parking is permitted on Ossington Avenue and Oakwood Avenue
- minimal driveway access and egress points on Ossington Avenue and Oakwood Avenue;
- predominantly single family housing on Ossington Avenue and Oakwood Avenue;
- no dedicated bicycle lanes on Ossington Avenue and Oakwood Avenue;
- no dedicated centre two way left turn lane on Ossington Avenue and Oakwood Avenue;

Although these differences may seem to be minimal they do have an impact on driver behaviour.

Therefore in view of the above this Division does not support the reduction of the speed limit on Marlee Avenue.

Vehicle Classification (Heavy Truck Review)

To assess the existing traffic modal split, 24-hour vehicle class studies were conducted. The following table identifies the results of those studies:

Marlee Avenue	Dir	Total Vehicles	Cars		Light Trucks		Tractor Trailers		Buses	
			Vol	%	Vol	%	Vol	%	Vol	%
Briar Hill Ave. To Stayner Ave.	NB	5310	5076	98%	155	3%	18	0.3%	61	1.1%
	SB	6690	6374	95%	178	2.6%	36	1%	123	1.8%
	Both	12000	11450	95.5%	333	2.8%	54	0.5%	184	1.5%

The results of the vehicle classification study confirm that only 54 (0.5%) of the overall traffic on Marlee Avenue can be classified as tractor trailers for this particular section of roadway. Of note, the northbound tractor trailer traffic volumes (36) are double than the southbound tractor-trailer traffic volumes (18). The study results have also concluded that the majority of the truck traffic occurs between the hours of 7:00 a.m. and 7:00 p.m.

The City of Toronto's road classification criteria states that "generally no restrictions" on heavy trucks should be imposed on minor arterial roadways as their primary purpose is of a minor arterial roadway, such as Marlee Avenue is the movement of traffic and servicing of the businesses located on the roadway.

Inappropriate use of a Heavy Truck restriction on any roadway may only lead to the other existing residential roadways being used as an alternate route, thus having a greater impact on the community.

Therefore, given that the roadways within the City of Toronto are assigned specific designations, both from a traffic operations and a road safety perspective, in order to allow them to perform as efficiently and safely as possible restricting "Heavy Trucks" on this particular section of roadway would not be feasible.

Summary

In view of all of the above this Division is recommending that the speed limit on Marlee Avenue not be reduced from 50 km/h to 40 km/h.

If the intent is to alter driver behaviour, it is our opinion from an engineering perspective that by copy of this memorandum to Staff Sergeant Michael Mattic of the Toronto Police Services, 13 Division we are requesting that they provide the appropriate level of enforcement as deemed necessary for this roadway.

As for the installation of traffic control signals at the intersection of Marlee Avenue and Wenderly Drive, this Division will once again review this location in the spring of this year to determine if the warrants for the installation of a traffic control signal have been met. Please note that upon the completion of our review this Division will advise you of the outcome of the investigation accordingly.

Should you have any questions or concerns please contact Jack Sinopoli, Supervisor Traffic Operations at 416-395-7467.

AK/cr
Attached

Warrant for Implementing a Permanent 50km/h Maximum Speed Limit on Arterial Roads

Marlee Avenue

Eglinton Avenue West to Lawrence Avenue West

The Warrants:

A permanent 50 km/h maximum speed limit may be implemented on an arterial road where one of the following two warrants A and B is met.

A. 85th Percentile Speed is less than 60 km/h.

The rationale for this warrant is based on safety considerations, as illustrated in the adjacent diagram. Risk increases with the deviation of a given driver speed from the speed of the main stream of traffic. If all drivers travel at the same speed, risk is minimal (see diagram on the side). As some motorists drive faster or slower, risk increases exponentially.

Therefore the 85th percentile is the safest speed and where risk is at its lowest.

If the 85th Percentile speed is operating at a speed that is lower than 60 km/h, then it only makes sense that the speed limit is lowered to 50 km/h.

B. If any combination of FIVE of the following criteria were answered as YES.

1. Pedestrian And Bicycle Related Factors

<i>Result 1.a</i>	Is pedestrian activity (Age under 12) Heavy ¹ ? Or Is pedestrian activity (Age under 12) Medium ² and sidewalk setback ⁴ is less than 2.5 m? Or Is pedestrian activity (Age under 12) Light ³ and sidewalk setback is less than 0.5 m? Or Is pedestrian activity (Age OVER 12) Heavy and sidewalk setback is less than 0.5 m?	<u>Yes / No</u>	
<i>1.b</i>	Is the bicycle activity (without a bike lane) High ⁵ ?	<u>Yes / No</u>	<u>Yes / No</u>

2. Collision Related Factor Result

<i>2</i>	Is the Probability of Safety Improvement Index (PSI index) low? (Emphasis is on collision patterns that cannot be influenced by localized improvements)	<u>Yes / No</u>	<u>Yes / No</u>
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3. Roadway Geometry Related Factors

<i>Result 3.a</i>	Is the number of curves per kilometre with a comfortable speed less than 60 km/h (Level/rolling terrain) equals two or more?	<u>Yes / No</u>	<u>Yes / No</u>
<i>3.b</i>	Is the number of locations per kilometre with insufficient distance to stop safely while travelling at 60 km/h equals two or more?	<u>Yes / No</u>	<u>Yes / No</u>
<i>3.c</i>	Is the length of speed zone < 1 km?	<u>Yes / No</u>	<u>Yes / No</u>
<i>3.d</i>	Is the number of non-commercial driveways per kilometre > 30?	<u>Yes / No</u>	<u>Yes / No</u>
<i>3.e</i>	Is the number of low-density residential driveways per kilometre > 5?	<u>Yes / No</u>	<u>Yes / No</u>
<i>3.f</i>	Absence of a Centre Left-Turn Lane	<u>Yes / No</u>	<u>Yes / No</u>

4. Roadway Operations Related Factors

<i>4. Roadway Operation Related Factors Results 4</i>	Is the On-Street Parking activity ⁶ Medium to high?	<u>Yes / No</u>	<u>Yes / No</u>
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Overall Warrant	If any combination of FIVE of the above criteria were answered as YES.	<u>Yes / No</u>	<u>Yes / No</u>
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40 km/h Maximum Speed Limit
[Marlee Avenue]
[between Eglinton Avenue West and Lawrence Avenue West]

Warrant	Requirement	Warrant Satisfied Yes/No
Warrant A Wide Roads	Pavement width equal to or more than 10.5 metres and the operating speed (85%ile) is equal to or less than 50 km/h. [speed limit reductions on wide streets have negligible impact and in these cases, other measures should be considered to influence driver behaviour to reduce speed, such as geometric changes to the road itself]	Yes- (12.5 m) Yes (50 km/h)
	Warrant A Met	YES
Warrant B Pedestrian Environment	Elementary or junior high school abuts the road. * OR Parkland abuts the road which is contiguous to and used to gain access to an elementary or junior high school. * OR No sidewalk on either side of the road or a major portion of the road. OR The sidewalk is immediately adjacent to and not separated from the flow of motor vehicles by long term parking (>3H) or bike lanes, where the traveled portion of the road width is less than 5.7 metres for two way operation or less than 4.0 metres for one way operation.	No No No No • Sidewalk adjacent to roadway but separated from traffic by bike lanes
	Warrant B Met	NO
Warrant C Road and Traffic Environment	Two or more locations of concern where: -Grades are greater than 5%; and/or -Safe speed on curves is less than 50 km/h OR Lack of sufficient distance to stop safely at two or more locations when traveling at 50 km/h. OR Pattern of collisions where vehicle speed was identified as a factor: -Local streets – 3 or more over 3 years -Other streets – 5 or more over 3 years OR Where long term parking (>3H) is permitted on one or both sides and the remaining traveled portion of the road is less than 5.7 metres for two way operation or 4.0 metres for one way operation.	No No Yes No
	Warrant C Met	No
	*Warrant A, B or C Met	YES

*Note: 40 km/h maximum speed limit must extend no less than 150 metres beyond the boundary of school property and/or contiguous parkland.
40 km/h maximum speed limit may be considered if either Warrant A, B or C are met.